



The Independent Guide to
IBM Personal Computers

Volume 1 Number 7 \$3.00

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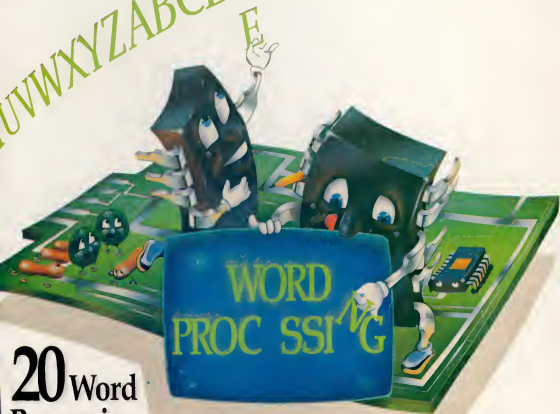
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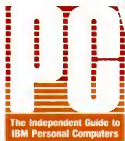
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Letters To PC

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Your treatment of PC subscribers is such that I feel the need to complain. For the third issue in a row the newsstands and computer stores had their PC's before I received mine. This is unfair to subscribers who pay in advance but must wait for their copies while single-issue purchasers are enjoying theirs. It is tempting to buy a copy, but paying twice is a bit much.

Willard O. Ward
Greenbrae, California

There are two reasons that dealers get their magazines before subscribers. Both are equally embarrassing. Wrapping subscriber copies in a protective wrapper adds 2 or 3 days to shipping time. In addition, PC has not yet received its second-class mailing permit from the post office. We are working to remedy this situation by the end of the year. In the meantime we are grateful for your patience and understanding.—Ed.

Patience Pays Off

It's September 29 and I just got my September issue of PC. I did get it in September, but little did I know when I resisted buying it from ComputerLand that I would have to wait until the last day of the month before I would get my copy. Can I expect that my copy will always lag 3 weeks behind delivery to the stores?

A few issues back there was an item about Jim Edlin's revolutionary word processing editor (for \$50 no less). Whatever happened to that?

Ron Lautmann
Mt. Kisco, New York

Concerning Edlin's word processor, your patience has paid off. Edlin's low-cost wonder program is reviewed in this issue. Hopefully, your patience with PC and the mail log will also pay off. Thanks for waiting.—Ed.

PC Color

I am disappointed in the limited color capabilities of the IBM PC. Please correct me if I'm wrong, but it is my understanding that in the low-resolution mode, where 16 colors are available, the smallest pel (picture element) possible is 4x4 pixels. The medium-resolution color/graphics



mode's smallest pel is 2 pixels and allows a very limited choice of colors—one of the 16 background colors with a choice of two sets of three predetermined colors each. In truth, there is no high-resolution color mode for the PC.

Do you know of a manufacturer that sells a color mode with true high-resolution color/graphics capabilities?

Larry E. Johnson
Minneapolis, Minnesota

Plantronics/Frederick Electronics in Frederick, Maryland, sells Colorplus, a product that is PC compatible and allows 80-character, four-color graphics in enhanced high-resolution (640x200) mode and 40-character, 16-color graphics in medium resolution (320 x 200) mode. For more colors and finer graphics, Control

Systems of Minneapolis, Minnesota has a more expensive product that gives 1024x1024 pixels of only 16 colors.—Ed.

Protest on Pascal

I enjoyed Dr. Larry Press's review of IBM's Pascal Compiler (PC Lab, August 1982), and I certainly agree that this compiler is not for beginners. I think it is unfair, however, to say that the compiler produces programs that run slowly. The speed of a program depends greatly on what debug options you choose when you compile it. The debug options are instructions to the compiler that tell it whether to report such problems as numbers that are too large, overflow of the stack, and array indices out of range. These options are described in the "Metacommand" section of the Pascal manual. Since Press's article says nothing about them, I assume that he left them turned on by default. This would explain why his program ran so slowly.

Turning to another aspect of the compiler, an important fact that the article did not mention is that IBM Pascal cannot draw pictures on the screen (using the color/graphics adapter board) or play music on the built-in speaker. These are serious limitations to the language.

Brian Schmidt
Chelmsford, Massachusetts

No Poison Pen

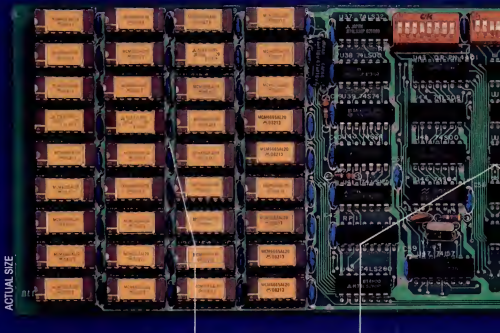
To date I have come out on the short end of the stick with the IBM PC versions of MicroPro's WordStar and MailMerge. MicroPro has some very fine products, but it apparently does not rank the support of its IBM PC customers as a high priority. I am not a writer of poison pen letters—strong yes, but not poison. I usually find that when I have difficulties, I am not the only one with a problem. If you have received other letters from people who are dissatisfied with MicroPro, please print them.

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Quadram has been shipping IBM boards with each of the Quadboard functions on separate boards since December, 1981. They are still available as separates (including a Dual Port Async Board) for those who desire a quality board but do not need to keep slots open for future expansion. And they all came with a one year warranty from the leader in technology applications.

256K MEMORY EXPANSION.

Socketed and expandable in 64K increments to 256K, full parity generation and checking are standard. A Quadboard exclusive feature allows parity to be switch disabled to avoid lock-up upon error detection. The dip switches also allow it to be addressed starting on any 64K block so that it takes up only as much as it has memory installed. Memory access and cycle time naturally meet all IBM specifications.

CLOCK/CALENDAR.

Quadboard eliminates the hassle of manually inputting the date on system boot-up by providing for the clock and all software routines necessary for inserting the appropriate programs on your diskettes. The internal computer clock is automatically set for compatibility with most software routines which utilize clock functions. On-board battery keeps the clock running when the computer is off.

BY QUADRAM

ALL ON ONE BOARD

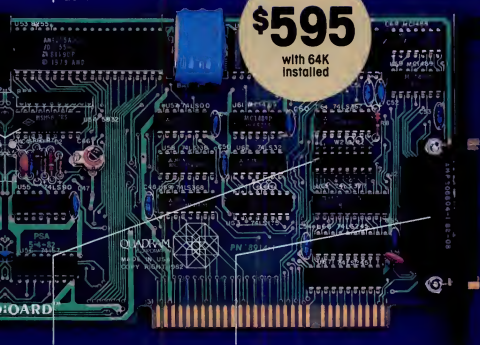
Now you can utilize all the PC's capacity with Quadram's extremely flexible configurations. And it's totally compatible with IBM hardware, operating systems, and high level languages. It's a full-size board that can be inserted into any free system slot and it even includes a card edge guide for securely mounting the board in place.

SOFTWARE TOO!

With Quadboard you receive not only hardware but extensive software at no extra cost. Diagnostics, utilities, and Quad-RAM drive software for simulating a floppy drive in memory (a super-fast SOLID STATE DISK!) are all part of the Quadboard package.

\$595

with 64K
Installed



PARALLEL PRINTER I/O.

A 16 pin header on Quadboard is used for inserting a short cable containing a standard DB25 connector. The connector is then mounted in the knock-out hole located in the center of the PC backplane. The parallel port can be switch disabled or addressed as Printer 1 or 2. No conflict exists with the standard parallel port on the Monochrome board. The internal cable, connector and hardware are all included.

ASYNCHRONOUS (RS232) COMMUNICATION ADAPTER.

Using the same chip as that on the IBM ASYNC board, the device is software programmable for baud rate, character, stop, and parity bits. A male DB25 connector located on the back connector is identical to that on the IBM Async Adapter. The adapter is used for connecting modems, printers (many letter quality printers require RS232), and other serial devices. Switches allow the port to be configured as COM1 or COM2 and the board fully supports IBM Communications Software.

INCREDIBLE PRICE!

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5 Year Warranty

Letters To PC

Hopefully, MicroPro will get the message and improve the quality of its service and support for IBM PC customers.

Jess McIlvain
Bethesda, Maryland

False Advertising

Having searched extensively for suitable, special-purpose software, I have come to the conclusion that the computer industry is adhering to a principle generated in the early '60s with the advent of "System 360."

I refer to the practices of never telling the truth about what software actually does or does not do, and advertising products as being "available" when in fact they will not be ready for several months. This is blatantly false advertising and is forbidden by federal law. I am seriously considering providing details to the appropriate federal agency. I don't know if other software buyers are finding the same inaccuracies, but for me 20 years of lies is enough.

James Berry
Las Vegas, Nevada

No More Gossip

I refer to the P-Communications article (PC, August 1982) that prompted IBM's Philip Estridge to write a letter denying the rumor that IBM was dropping ComputerLand as a PC dealer (Letters to PC, September 1982). As a publication that is supposed to enlighten the PC user, you should refrain from printing stories that only serve to confuse (and perhaps discourage) potential PC users.

I'm all for freedom of speech, but let's not forget about responsible journalism. I knew that the ComputerLand story was untrue almost as soon as I had read it, because directly to my left stood the owner of a local ComputerLand store who told me it was untrue.

P-Communications is PC's one weak link.

You should either take corrective measures to make it a more reliable source of information or banish the column altogether. PC can afford to wait to verify new information before printing it, rather than resorting to rumors and gossip. People rely on PC for accurate updates. News items should continue to appear, but in the responsible, trustworthy, and authoritative manner that fits the PC image.

Randolph Madera
Forest Park, Illinois

Good, But No Cigar

PC's quality is not very good yet as far as information goes. You could increase the article-to-ad ratio—not that I'm complaining about the ads; they're very useful.

John Dodds
San Francisco, California

Not-So-Easy Writer

I had been warned about rampant misinformation and misrepresentation in the young personal computer industry. Despite these warnings, I nibbled at one advertisement and was bitten.

While searching for a suitable word processing program, I visited several computer stores to view demo disks. I talked with the people at Information Unlimited Software, Inc. about EasyWriter II and was impressed. After I purchased the package, I found out that my printer (a Daisywriter) was not listed as a support system in the documentation package.

My expensive investment sat idle because I couldn't convince my printer to run with the software. I called the company to ask for information not included in the documentation. The company would not answer questions over the phone; if I wanted to learn how to get the printer to work, I would have to send a \$70 check to enroll in the support program.

For anyone trying to use EasyWriter II with a daisy wheel printer, here is the in-

formation free of charge: Configure the printer type in the housekeeping disk to "standard printer," and save your \$70 for a software firm that is more interested in its customers.

Joel Zureick
Reynoldsburg, Ohio

No Pros at MicroPro

After reading MicroPro's glossy advertising, I bought the version of WordStar that is compatible with DOS 1.0. One of the major factors in my decision was the well-publicized ability of WordStar to do subscripting and superscripting. After breaking the seal on the package, I found a paragraph in the manual that casually informed me that subscripting, superscripting, microspace, justification, boldfacing, variation of line height, and character pitch selection were not possible in the IBM version. This was news to me as well as to the dealer who sold me the package.

Burton Alpersen, Ph.D.
Los Angeles, California

Check the Manual

I am about to purchase an IBM PC and have found your magazine to be very helpful. In the article "PC On a Budget" (PC, September 1982) you said that to add 48K of RAM unto the mother board all you have to do is plug in the chips. How does the PC know you have added this additional 48K? I was told you have to change some switches. If so, which ones? You also said that the installation of the disk drives is tricky, but not difficult. Could you be more specific?

Michael Pate
Houston, Texas

The information you are looking for is in the IBM Guide to Operations, Section 5.

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Letters To PC

under Options. Page 5-15 shows you exactly which switches to set to inform your system of options attached.—Ed.

Letter-to-Letter

I must take issue with Stewart Dean (Letters to PC, September 1982), who was highly critical of your magazine. I was floored by your scathing review of EasyWriter, not because it was critical, but because it was objective. Your first magazine saved me more than the price of a subscription. Yours is a dedicated magazine I can trust. The IBM PC is the most flexible machine available and is the only micro I would own. PC is the only computer magazine I read, and I certainly rejoice in your success.

Mike Doneho
Marietta, Georgia

Teasing Tactics

I read the article "VisiCalc and Your Stock Portfolio" (PC, August 1982) and was so impressed that I immediately sat down to order myself a copy of the book. I found no address, however. In the future you might try avoiding such teasing tactics.

V. Jay Poscente
President, Megamini Developments Ltd.
Calgary, Alberta
Canada

The address is: OSBORNE/McGraw-Hill, 630 Boncroft Way, Berkeley, CA 94710.—Ed.

Equal Time for Techies

I want to see more technical articles. I realize that PC is oriented toward the professionals who use computers rather than those of us who make them work, and to the extent that this means a spiffy format, well-written articles, and dynamic graph-

ics, I'm all for it. But remember that those same users are bright, inquisitive folks who want to understand the technical side better, and remember too that the PC has been hugely successful with the technical sophisticates. We need a forum, too.

Many of us guide our companies' computer policies and purchases, so we need good, comparative reviews of available products. Others actually program. We need to know which software development tools—compilers, debuggers, text editors—are worth the bucks. Just to get an idea of how valuable such information is, consider that the usual strategy for finding out what's adequate is to buy one of everything and play for a month.

Hanno Hinsch
Washington, D.C.

Alias Publication

Are the IBM Personal Computer Journal and the Personal Computer Age described in the "PC Product Guide" (PC, September 1982) the same publication? The addresses are identical and the descriptions are similar.

Larry Johnson
ST6361

The people in Tujunga, California, claim responsibility for one publication, Personal Computer Age, which at one time was called the IBM Personal Computer Journal.—Ed.

Bithood Re-questioned

Your usually high standards appear to have slipped somewhat in Hal Glatzer's article "The Bithood Question" (PC, August, 1982). I found several misconceptions and simplifications.

The article says, "An 8-bit microprocessor is limited to 64K RAM. ... A 16-bit microprocessor ... can handle address-

es up to 16 places long ... and can work with up to ... 256K RAM." There are two kinds of addresses: the address relative to the beginning of the program and the physical address in memory. The processor converts the program address to the physical address by adding the physical starting location of the program, which it holds in an internal register, variously called a bank, base, page, relocation, or segment register. The maximum size of these two types of addresses are an outcome of design trade-offs between memory size and speed and circuit complexity. The maximum size has no direct connection to the internal register size, which is what is usually meant by the bit size of a machine.

The maximum size of a program address depends on the number of bits in the instructions that represent an address. This is typically 16 bits, giving an addressing capability of 64K. The maximum size of physical memory is arbitrary and can vary with different machines within a single series, e.g., DEC PDP-11.

The IBM PC uses an ingenious arrangement of not one, but four segment registers, each one of which can address 64K. Which register is used depends on the context: One points to instructions and is used by the processor every time it gets an instruction; another points to the stack and is similarly used for stack references; the last two point to data areas. They may all be changed by the programmer (even BASIC can control one segment register with the DEF SEG statement), and thus all of the physical memory can be used.

Elsewhere Glatzer says, "There are some tasks for which 8-bit processing is inadequate. One of the most useful is graphics. ... Generating high-resolution graphics requires an address for every pixel." Wrong. The IBM PC in high-resolution graphics mode uses 1 bit per pixel. This 640x200 bits = 12,800 bits = 16K, which is the capacity of the color graphics board.

Glatzer remarks, "... the 18-bit proces-

Letters To PC

sor is not powerful enough for certain kinds of mathematical calculations. ... Floating-point arithmetic ... puts a huge demand on the computer for storage space and address capacity." Floating-point numbers are typically held in 32 or 64 bits, which is not large. For instance, a 64K segment in the IBM PC could hold 16,384 floating-point numbers. The speed depends on which of two ways floating-point arithmetic is done. Some machines have special hardware, often supplied only as an optional extra. Software routines can be written to achieve the same results, albeit more slowly, since dozens or hundreds of instructions must be executed. The 8088 microprocessor in the IBM PC has a floating-point extension available (the 8087 coprocessor), and one company has just made this available on a separate board. In conclusion, some 16-bit machines can have quite a respectable number-crunching capability.

Phil Mayes
Santa Barbara, California

A Tall Order

We at Tall Tree Systems appreciate PC magazine and are frequent advertisers. The directory issue (PC, September 1982) is great and will most likely be used as a reference tool for a long time. It was a disappointment to us, however, that the information was edited and that our telephone number was misprinted. I am referring to entry number 27, I.R.A.M. The correct phone number should be (415)941-5500.

Tall Tree Systems
Los Altos, California

Improving With Age

I believe your magazine has a good blend of advertising and articles. Some of the earlier articles were not technically correct, however. For example there is no such thing as a 32/70 mainframe (see

"Boca Diary," PC, April/May 1982); the 3270 is a family of IBM terminals. But you are getting better all the time. In all, PC is a must for anyone who uses, owns, or is interested in the IBM PC.

Robert W. Paterson
Lexington, Kentucky

Addressing the Issue

I am interested in finding out more about the 16x80 LCD display mentioned by Jean Yates and Dr. Rebecca Thomas in "The Visi-calculator Dream Machine" (PC, August 1982). The article mentioned Sunnyvale as the location of the manufacturer, but the listings in Sunnyvale are all residences. Please give me the correct phone number and address.

Creative Resources in Technology
Renton, Washington

Contact Cockcroft International at P.O.
Box 4924, Foster City, CA 94404,
(415)345-1940.—Ed.

Correction

In the September interview with Marty Alpert, "Tectmar's Triumph: A Decade of Success" (PC, September 1982), we mistakenly quoted Alpert as predicting that 3¼ to 3½ million IBM PCs would be in the field by the end of 1983. His actual prediction was between ¾ million to 1½ million IBM PCs.

Pascal People

I know that IBM is offering a Pascal compiler that requires 128K and two disk drives, and I have seen advertisements for the UCSD p-System with Pascal. This p-System compiler also requires two disk drives, but the minimum memory requirement is only 64K. Can you explain the difference between these two options? What exactly is the UCSD p-System, and is there

any advantage to a 64K system?

Lance Wolf
Allendale, New Jersey

Your wish is our command. Last month's PC (October 1982) featured an extensive review of the UCSD p-System by Tom Woteki and Alan Freiden. By now you should have received your copy and found everything you need.—Ed.

Which DOS?

I have noticed that when you mention DOS in various articles, you neglect to specify the version. Now that there are two versions of the IBM operating system, it would be very helpful to the reader if you would specify whenever possible.

John Thomas, Jr.
New Vernon, New Jersey

Our policy has been to use the most updated software in our reviews unless otherwise specified. We will try to be more specific in the future.—Ed.

Wish List

I wish there were some way to respond to your Wish List column. In the September 1982 Wish List, Lee Middleman wished for exactly what my company sells. Pro-Key from ProSoft not only fulfills Middleman's wish by enabling users to define special function keys, it allows the user to define tedious or difficult input sequences so that they can be played back over and over with minimal effort. It attaches to DOS and works magic for most programs (especially VisiCalc and WordStar).

David Rose
Seattle, Washington

PC welcomes letters from readers. Write to: Letters, PC, 1528 Irving St., San Francisco, CA 94122. Letters may also be sent electronically through The Source: 87#948, or CompuServe: 783#532.

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in from a parallel computer and out to a serial printer. Microfazer is just as flexible as you need it to be.

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Tracing My Word Processing Roots



Getting my first word processor was a big event. From that day forth the torture of retyping draft after draft was over. Minimizing the nerve-racking hum of my electric typewriter was an added bonus.

As one remembers a favorite car from the past, I fondly recall that my first word processor was built around one of the better so-called S-100 bus machines, the Sol, by Processor Technology. It had a great keyboard with lots of function keys and was packaged in a sky blue, metal box with real wood panels. Designed by Lee Felsenstein, who later designed the Osborne portable computer, the Sol was a pleasure to work with.

Unlike the Sol, however, the rest of my system was sadly rudimentary. Not having the funds for a disk drive, I used a cassette recorder to store programs and files. Loading a program took about 5 minutes when it loaded correctly, which was approximately one time out of three.

The word processing program I used was crude, but adequate for my needs. It was slipped to me by a friend at GRT Corporation, a company that, like Processor Technology and host of others, has since gone belly up. Because the program was most likely pirated, I had no documentation. Learning to use it was a matter of trial and error, a task performed by my friend Jim Edlin, who has a great deal more patience than I have. I loaned him my system for a few days and he came back with a list of commands. But these problems were minor compared to my biggest handicap—I had no printer nor the resources to acquire one.

But even sans printer, this system still presented a quantum leap over my electric typewriter. I wrote and edited letters, articles, and book chapters on the screen. Once they were as perfect as I could make them, I typed the final copy from the

DESPITE system crashes that wiped out whole files, I felt a sense of liberation.

screen. By this means I was liberated from retyping draft copies and was free to make all the editing changes my little heart desired.

Despite occasional system crashes that wiped out whole files, and my frustration with awkward editing commands, I felt a sense of liberation. No matter how many times I fiddled around with the words in a sentence or how many misspellings I found, I wasn't punished for correcting errors or experimenting.

The fruits of this liberation showed up quickly as my then struggling career as a free-lance technical writer began to pick up. Using my Sol, I could turn jobs around much faster. This gave me more time to

hustle new contracts. I also had more time for sitting in the jacuzzi.

But the real payoff came when Jim Edlin and I used the Sol in tandem with Jim's Selectric typewriter to collaborate on a book proposal that not only brought in a sizable advance, but also yielded a donation of three micros, three modems, and an excellent letter quality printer. True liberation was just around the corner, or so it seemed.

Our micros, CompuColor II's, arrived 6 months after their promised delivery, and our printer came shortly thereafter. This turned out to be the beginning of a period of my life that was dominated by software/hardware headaches of migraine proportion.

For openers, our CompuColors had a funny habit of literally blowing up. Everything would seem to be functioning fine when suddenly a loud bang would be followed by a cloud of smoke coming out of the monitor. This was discouraging. Worse yet, the nearest repair facility was 60 miles away and frequently couldn't get to our problems for a week to 10 days. It turned out that neither our micros nor our word processing program worked with our printer.

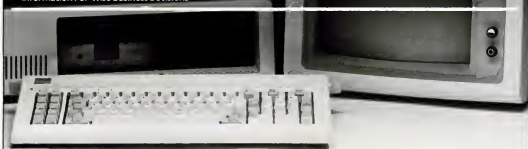
After writing our own printer interface and making numerous trips to the repair facility, we finally got our system running. By that time, however, the book project was hopelessly behind. From the CompuColor II, I graduated to a Wang office system with a feature called "Super Copy" that allowed for high-speed transfer or copying of selected text from one file to another. I also put in many hours on the Xerox 860, which features full-page display.

These days I use my hard-disk-equipped PC with a variety of word processors. I like and hate all of them equally. /PC



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Plug In, Dial Up, Or Lose Out



Personal computers seem headed toward becoming this decade's mind-expanding agent. But first we have to heed the above revisionist version of Timothy Leary's famous '60s call to inaction. The true mind-expanding potential of personal computers will not emerge until they can communicate.

The shame of the personal computer industry is its criminal neglect of communications. IBM should be embarrassed that its customers must turn to third parties if they want their PCs to hook up to the rest of the world. And its many partners in negligence, from Apple to Xerox, are also missing the boat.

Ideally every personal computer should roll off the assembly line, ready to be plugged into a standard phone jack so it can exchange messages with its peers. If all the manufacturers made that commitment, the added cost to each machine would quickly become marginal. But since the manufacturers are not committing themselves, I am urging you—personal computer buyers and owners—to take the step on your own.

This column is always advising you to go out and spend your hard-earned money. A while ago I urged you to make the investment in a color-capable PC system to encourage the development of powerful, color-exploiting programs. Now I'm back with more of the same—this time suggesting that you consider your system incomplete unless it has at least elementary telecommunications abilities.

Viewed against minimum PC systems, such abilities may require additional ex-

penses. But for those whose IBM PC system is a more typical workhorse configuration, the necessary additions for communication should bump the price by no more than 10 or 12 percent. The added usefulness, however, should soar to dou-

THE TRUE MIND-expanding potential of personal computers will not emerge until they can communicate.

ble or more before your first year is out.

Your PC can be equipped for basic telecommunications with just four items: a telephone connection device (modem); an adapter to tie it to your PC (serial interface); a cable to connect the first two items, and a program that lets you put them all to work. Shop carefully and you can find the whole lot for \$200 or less. Double your investment and you will get a modem capable of answering the phone without assistance and dialing phone numbers under computer control. (Both are useful for electronic mail.)

Telecommunicating personal computer usefulness observed in ordinary telephones: The greater the number of people

ers conform to the same rule of increasing who have them, the more useful each one becomes. When you get the necessary hardware and software, you're not only adding to the usefulness of your own system, you're also adding to everyone else's.

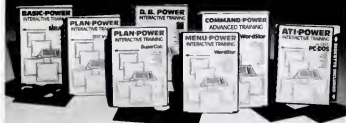
Don't let all the fuss about high-tech communications strategies confuse or delay you. Go for the bird-in-hand; don't hesitate to plug into proven technology while other alternatives sort themselves out. This refers specifically to the so-called "local networks."

What makes systems "local networks"? What makes them "networks"? Draw six dots in a circle on a piece of scratch paper. Draw lines among them so that each dot is connected by a single line to every other dot. The resulting figure should look like a net. Thus, "network." A network is the original and simplest method of establishing connection channels among several points. Other major strategies accomplish the same thing: visualized on paper, they would look nothing like a net, but the term survives from that early image.

What makes a network "local"? Today's technological limitations, that's what! The performance we desire today from a connection between computers—chiefly, fast response and high capacity—can be achieved with relative ease across short distances. These same qualities would be desirable in a universal network, but we don't know how to achieve them practically or affordably at that scale. So we accomplish them at the scale we are capable of and call it a local network.

To my mind, local networks are a dis-

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With D.B. POWER you'll be able to create a data base, enter data, sort data, add, modify, change, and edit important data to generate comprehensive reports — even develop mailing lists — in less than one hour! **\$75.00**

POWER PACK for WordStar (IBM)

MENU-POWER Interactive Training helps you create documents, edit with insert, delete and strike over, and print documents. In less than 45 minutes, you'll be able to use the WordStar menus to perform powerful word processing operations.

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ATI-POWER for IBM-DOS

With ATI-POWER PC-DOS you'll learn how to use 12 of the most common PC-DOS commands in less than one hour! You'll be able to display the directory, copy files and disks, rename files, and much more. You'll also be able to prepare, monitor, maintain, even troubleshoot your own system — like a pro! **\$75.00**

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With BASIC-POWER you'll be able to develop business applications programs that really work. You'll be able to write, enter, debug and use programs that analyze business expenses or organize mailing lists in less than two hours! **\$75.00**

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traction. Widespread communication with adequate performance is better than narrowly restricted communication and super-zowie performance (though if you can afford and justify both, then by all means you should have both).

If your phone is too slow, high-speed exchange of data files can be done within your office by taking a diskette from your computer to another down the hall. But slow telecommunications will seem wonderfully fast when it allows you to review a contract draft 10 minutes after it has been written by an attorney 2,000 miles away.

Miracles are not necessary for the exchange of information with clients, customers, suppliers, prospects, attorneys, accountants, or editors across town or across the country. File transfer programs are available that will let you communicate with different brands of computers using programs other than the ones you have.


Sometimes simple tricks can overcome communications barriers. Most word processing programs can be set to print to the modem as if it were a printer, and a program on the other end of the connection can treat the incoming data as if there were a person at the sending end typing at a keyboard.

With today's products you may have to educate yourself slightly on such niceties as baud rates and stop bits to enjoy the maximum range of communications opportunities. But when you want a prospect to see your proposal immediately, that capability may seem worth the effort.

As long as you get a modem of the originate-and-answer type (highly recommended), you won't need to subscribe to any commercial communications service other than your local phone company, though several offer helpful facilities, such as formalized structures for electronic mail. (If you do sign up for one of these services, make sure you let the world know by including your network address on your business cards and letterheads, and then check the service periodically to see if anyone has taken up your implied invitation.)

Personal computers can do for our left brains what hallucinogens were purported to do for our right brains. But if we don't equip our PCs so they can plug into the phone system and dial up their electronic peers, we will lose out on much of what they have to offer.

/PC



The DSI-501 Disk Drive fits into the 2nd slot on your IBM Personal Computer, to give you 5 MB formatted (6MB unformatted) storage for \$1995. The DSI-512 provides 10 MB formatted (12 MB unformatted) storage for just \$2495. And the DSI-519 provides 15 MB formatted (19 unformatted) for \$2995. Compatible with IBM software.

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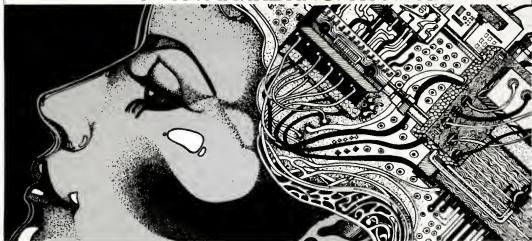
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- Automatically **FORMATS** text and footnotes, placing footnotes on the bottom of the correct page.²

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- While in WordStar, type a symbol³ for each footnote and enter the text of the footnotes **anywhere** in the file.⁴
- After saving the WordStar file, run **FOOTNOTE**. The result is a fully formatted and fully editable WordStar file.⁵

¹The numbers can be superscripted or non-superscripted, at the user's option.

²At the user's option, the footnotes can also be removed from the text file to a separate note file.

³The default symbol "@" can be changed to any other symbol.

⁴Footnotes can be entered singly or in groups. They may be entered in the middle or at the end of paragraphs, or in a completely separate note file.

⁵The user can modify, add, or delete text and notes and run **FOOTNOTE** again to re-number and reformat the edited file.

PAIR™

WordStar users who underline phrases, or set them in **boldface**, often discover only too late — when the printer suddenly slows down — that they forgot to end the special print command. **PAIR** checks that print commands are properly terminated, and marks all errors in the text for easy correction.

FOOTNOTE and PAIR require 48K RAM and CP/M 2.x, CP/M-86 or IBM PC DOS, and WordStar Formats 8" SS/SD, 5 1/4" NorthStar DD, Micropolis Mod II/Vector MZ, Superbrain 3.0, Apple II with CP/M, 5 1/4" and 8" Xerox 820, HP-125, HP-87, Televideo, IBM PC (specify DOS or CP/M-86), IBM DisplayWriter with CP/M-86.

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P-Communicues

A compendium of facts, news, inside intelligence, opinions, gossip, speculation, and forecasts about IBM Personal Computers and related matters.



Charlie Chaplin Joins the Ad Wars

IBM has him perched on a ladder next to a gigantic floppy disk, inviting program authors to send in their software. PC put him on its cover. And now NEC has him—complete with bowler and moth-eaten gloves—daintily dabbing tears as he contemplates the Japanese firm's new Advanced Personal Computer.

The charming silent film character that Chaplin created has always held a secure place in American culture, and it appears that he has entered the domain of advertising as well. In a campaign reminiscent of Avis going after Hertz a few years ago, NEC boldly proclaims that its new computer "gives Charlie the blues."

New Supplier Assembles PCs

In an agreement announced late this summer, SCI Systems Inc. of Huntsville, Alabama was awarded a contract to assemble the electronics for the IBM PC. The PC assembly work by SCI began in July (concurrently with the beginning of that firm's new fiscal year), with full production expected by December. The \$150 million contract calls for SCI to assemble the PC's internal electronics through the end of 1983. The Alabama firm is using its new \$5 million plant for this operation.

In addition to its electronic assembly work for IBM, SCI

recently signed a contract to produce the Lexicon Lex-31 Personal Communications Computer for Lexicon Corporation of Fort Lauderdale, Florida. Many of SCI's projects involve defense work, such as a recent Air Force contract to produce airborne test

range instruments. The firm also manufactures control and alarm equipment for the petrochemical industry, currency-handling devices for banks, and electronic products for the health care industry.

Department of Mirth

In our continuing effort to add a light touch to the PC world and computing in general, P-Communicues is initiating a Department of Mirth. We encourage readers to submit jokes, amusing anecdotes, and other entertaining items of interest to PC users. We'll pay a modest fee for each contribution we use. We'll start the cursor moving, so to speak: What did one computer say to the other? "I've got a crash on you!" Or, "This baud's for you."

Yes, we're sure you can do better than that—please send your gems to P-Communicues.

Software May Be Added to Copyright Law

Although computer programs are generally published with the standard copyright notice in their manuals and on-screen identification, software is not specifically mentioned in federal copyright law. A new bill by Representative Robert W. Kastenmeier, a Wisconsin Democrat, would change that by adding computer programs to the list of items spelled out for protection by that law. Unfortunately, this bill was introduced late in the congressional session, and there is little chance of its passage by both the Senate and the House before Congress adjourns in October.

FORTRAN Bugs

FORTRAN users should be aware that there are problems with the compiler being published by IBM and operating under PC-DOS.

Dealers should be able to provide documentation covering the problems, along with patches and other hints to avoid trouble. One problem area is this: Programs that utilize more than 256K of memory seem to be particularly susceptible to Error 1268 (dynamic file allocation limit exceeded). When the size of the data area is reduced to allow the entire program to fit within 256K, the problem goes away.



Illustration: Stuart Bradford

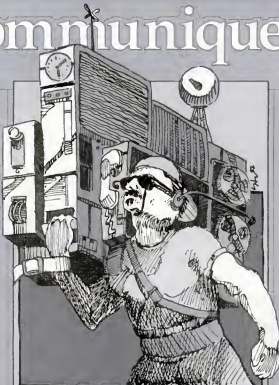
P-Communicues

EasyWriter Swap to Expire

As many PC users know, IBM has released a revised version of the EasyWriter word processing program, labeled EasyWriter 1.1. If you bought the original version of EasyWriter, labeled 1.0, you may obtain the new release at no charge by taking the first page of the EasyWriter manual (it's lavender, with 6172310 to the bottom left) to your authorized PC dealer. But you must make this exchange by December 31st of this year to get the new release for free.

Computer Literacy Test

ComputerTown USA! a microcomputer literacy project sponsored by the People's Computer Company of Menlo Park, California, is accepting proposals from individuals and organizations that would like to become an official test site for the project. The site chosen must be located in the United States, east of the Mississippi River. Applications and further information about ComputerTown USA! are available from ComputerTown, P.O. Box E, Menlo Park, CA 94025, (415) 323-3111. The deadline for applications is December 1st.



Infotainment?

Future shock has come and gone, and media shock is setting in. At least that's the way a prediction for technology circa 1990 makes us feel. Strategic Inc., a market research firm in San Jose, California, recently released a report that promised an all-in-one "home infotainment center" as the ultimate in electronic comforts. This rather incredible cluster of devices would include a large-screen television, stereo receiver and turntable, connections for speakers and audio and video cassettes, and a videodisc player, not to mention a built-in telephone, clock, and synthesizer. Oh, and more connections for disk drives, a hard disk, and—phew!—an expansion bus that's compatible with the PC. Frankly, we're waiting until it's portable.

Forbes, and *Chonging Times*. In a move that demonstrates just how completely micros have permeated public consciousness, *Time* inaugurated its first new department in many years—Computers—with a cover story on kids and computers. And the highly respected *Consumer Reports* has also joined the computer ranks by announcing that it has formed a task force to test microcomputers.

Diagnostics Update

Several readers have written to tell us that IBM has issued an update of the Diagnostics program; the updated disk was sent to all "designated service locations" earlier this year. The "Keyboard Error 301" message that was displayed on some users' screens during a diagnostics test with the original version of the program was caused by a timing problem between the diagnostics software and the keyboard hardware. Consult your dealer for details about the corrected diagnostics program.

Writing to Read

If you feel dated because you don't know who Ms. PacMan is or have trouble relating to your teenager who has begun calling earth another galactic station, then wait till your kindergartner comes home with a computer printout of his or her Christmas list. IBM's 1982 budget includes a plan to give about 10,000 kindergartners and first grade students the chance to use some 300 IBM PCs to introduce reading and writing fundamentals.

THE AGE OF
**MICRO
COMPUTER**

1982: Year of the Micro

This year may mark the coming of the age of microcomputers in popular media. Personal computers have received cover-story treatment from no less than four major magazines in 1982: *Newsweek*, *Time*,

IBM Issues "User Updates"

As of July the IBM Personal Computer division began publishing and distributing "User Updates" to authorized PC dealers. July's 1-page offering announces this new bulletin's intentions and provides a few specific hints: August's eight pages of updates offer further tips on hardware and software use and clarification or correction of items published in manuals. Each of these documents is labeled clearly at the bottom, "Future User Updates are available at your authorized

"In some sense, all companies in the computer industry are orchids on IBM's tree. Everyone has to consider IBM's pricing and strive for compatibility with IBM equipment."

—Trocy Kidder
The Soul of a New Machine

IBM Personal Computer dealer," implying that users should be able to obtain copies from a dealer or at least study the dealer's set and take notes.

Following are some tips from the User Updates:

- If you use a television as a display for the PC and are getting disk read errors, move the TV at least 12 inches away from the PC System Unit. The television might be emitting signals that are picked up in the disk read circuitry, causing errors in data transfer.
- If you use one display adapter card, IBM recommends that it be installed in Slot 2 of the PC. If you use both a color/graphics adapter and the monochrome adapter, be sure that the color/graphics card is in Slot 2. (The other adapter card should go in Slot 3.) The color/graphics card is about 1/2 inch taller than other PC cards, and Slot 2 is the only advisable location for it. Placing this card in Slot 3 could cause excessive pressure on the card itself and on a ROM package below it.



service that is the subject of an article in this issue of PC.

The four Dow Jones software packages are: Market Analyzer, a technical analysis product designed to collect, store, and update financial information; Market Microscope, a fundamental analysis product that provides users with the ability to set buy and sell points and other parameters; Market Monomer, a portfolio management product that provides an accounting and control system for financial holdings; and Connector, a communications package designed to link microcomputers with other computers, including the Dow Jones News/Retrieval and other data bases. Two of these packages, Market Analyzer and Connector, are ready now; the others are expected late this year.

Now for the bad news. At present, Dow Jones software is available on only Apple II and Apple III computers. The folks at Dow Jones are reluctant to promise any dates for the software's availability to PC users, but the firm is expected to implement the products on the PC, probably early in 1983.



Big Isn't All Bad

"In this day of distrust of large institutions, I'd like to report that I have received courteous and efficient help from Big Blue. A problem cropped up during the first 30 days I had my PC, and a control number was assigned to me by the people at the 800 help number. I was unable to get the machine off some important projects until 3 months later, but the Los Angeles service center handled a system board replacement with speed and efficiency.

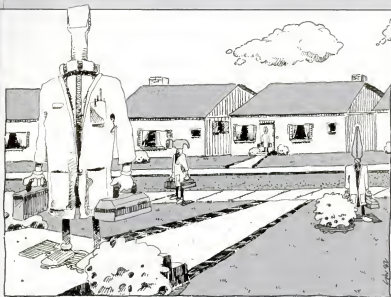
"Shortly after my machine was returned, the 'Parity Check 1' gremlin popped up, and within 2 days IBM had once again replaced the system board. [It seems that heat buildup exposes the problem.] I pass this along to affirm that IBM is keeping up its standards of service."

W. Terry Van Hook
Bellflower, CA

Dow Jones Enters the Software Fray

First the Wall Street Journal and Barron's, then the Dow Jones News/Retrieval electronic data base service, and now Dow Jones software. In October Dow Jones announced the first four products in its new venture into the software market. All are designed to take advantage of the existing Dow Jones News/Retrieval, the extensive electronic news and financial

P-Communique



Computer Mechanics Multiply

With microcomputers becoming a household fixture, can the repair technicians be far behind? No, according to International Resource Development, a research firm in Norwalk, Connecticut. This firm's recent study predicts that the major service companies, which now do an annual \$500 million business repairing big computer systems, will soon set up carry-in service centers for personal computer owners. Within 10 years, the researchers promise, computer repair will be a \$3 billion business.

More Adventures of the Intel 8087

In the August issue (*P-Communique*s and *New on the Market*) we reported the availability of the Intel 8087 mathematics processing chip for the PC. The firm that offered the chip, Sun Coast Data Sciences of Costa Mesa, California, is no longer operating. (Because of a typographical error, we called that firm South Coast Data Sciences in one place; there is

no company by that name.)

PC users are not without a source for the 8087 number-cruncher, however. MicroWare, P.O. Box 79, Kingston, MA 02364, (617) 746-7341, sells the 8087 chip as part of a combination that includes installation instructions, a book entitled *The 8087 Guide*, and a choice of one of MicroWare's software packages. These packages include 87MACRO, a library of assembly language macros that work with the IBM MACRO Assembler; 87BASJC, a library of drivers that work with the BASIC Compiler; 87PASCAL, a library of drivers

that work with the Pascal Compiler; and 87FORTRAN, a library of drivers that work with the FORTRAN Compiler. The chip-and-software combination sells for \$375, and the individual software packages sell for \$125 to \$150.

MicroWare President Ann Fried emphasizes that the 8087 chip can be installed as an individual unit and does not have to be paired with a new 8088 chip. Thus users do not have to replace the 8088 processor that is already installed in the PC in order to utilize the 8087 chip from MicroWare.

Home Computers Find a Home

A group of computer enthusiasts has founded the International Home Computer Users Association (IHCA), an independent, nonprofit organization open to individuals and user groups. The following are among the services announced by ICA: biweekly bulletins of news and computing tips; a monthly newsletter; a library of hardware and software reviews and newsletters from other user groups; a "start-up kit" for people who want to start a user group; a speakers' bureau; and special assistance with programming and consumer issues.

The International Home Computer Users Association is located in the San Diego area but expects to coordinate activities nationally and internationally. For information write to P.O. Box 371, Rancho Santa Fe, CA 92067.

P-Communique Says

Do you have news, gossip, or unusual computer tales for *P-Communique*s? We will pay up to \$50 for each submission used. You must include your name, address, and telephone number with the item. We will preserve your anonymity if you wish. All submissions become the property of PC and are subject to editing. Our *User-to-User* section also publishes and pays for readers' submissions; that section features tips, problem solutions, and short programs or routines. Please address submissions to *P-Communique*s or *User-to-User*—PC, 1528 Irving St., San Francisco, CA 94122.

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John Ford, Infoworld

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James Fallows, Atlantic Monthly

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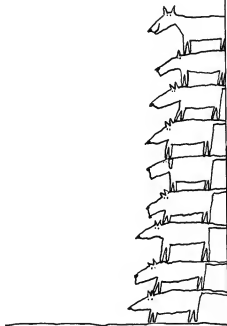
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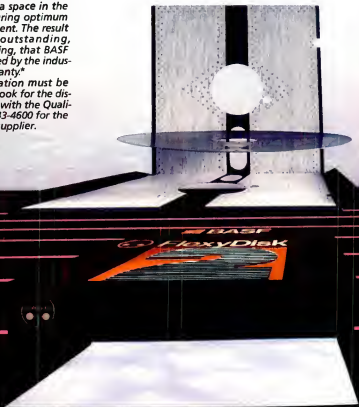
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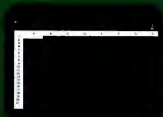
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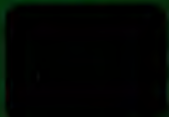
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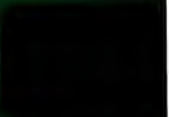
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WORKSHEET

YES

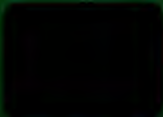


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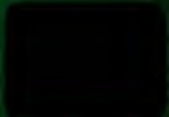
"NAMING" OF CELLS
OR AREAS

NO

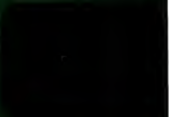


PLAIN ENGLISH PROMPTS

NO

INDIVIDUAL COLUMN
WIDTHS

NO

EXTENSIVE FORMATTING
CAPABILITIES

NO

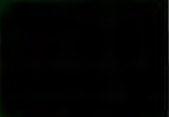


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YES

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Region 3 Sales	\$2,000,000	\$2,020,000	\$2,040,000	\$2,060,000	\$2,080,000
North American Sales	\$10,000,000	\$10,170,000	\$10,340,000	\$10,510,000	\$10,680,000

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YES

YES

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PC Tutor

Using monochrome and color monitors, copying dual-sided disks, and adapting WordStar for dual printers. Find helpful suggestions here.

The Color Question

Q: I'm using both the IBM monochrome display and an Amdek color monitor. I've been successful at switching from the monochrome display to the color monitor and back again in BASIC only. This has prevented me from using my color monitor for programs such as VisiCalc. Also, when I'm using the color monitor and I return from BASIC to DOS, I lose the picture and must resort to reloading the program. Do you have any suggestions?

Cal Crawford
Los Angeles, California

A: Almost everyone who has installed dual monitors on the PC has asked about this. Although the BASIC 1.1 manual includes programs on page 1-8 that allow users to switch from one display to the other while in BASIC, these programs do not enable you to use the color display when running a .COM or .EXE type of program. Please see "MONO.COM and COLOR.COM" to learn how to change monitors while operating at the command level of DOS.

The problem of losing synchronization on the color monitor when returning to DOS from BASIC occurs only in DOS 1.0. IBM has corrected this problem in DOS 1.10 by forcing DOS onto the monochrome display when returning from BASIC. Although this may not be the best solution to the problem, it eliminates the need to reboot the system.

Before I leave this subject, I should pass along an experience that one PC owner had while setting up his system with both color and monochrome monitors attached. This individual was developing color graphics software and felt he should be able to boot up his system on the color monitor even though the IBM Personal Computer Technical Reference Manual indicates that the system should be initialized on the monochrome display when both monitors are attached.



SMOKE BEGAN
rising from the top of
the monochrome
display, signaling
its demise.

Setting two DIP switches on the system unit board indicates to the Basic Input Output System (BIOS) which monitors are installed. Switch 1—positions 5 and 6 off—indicates that either the monochrome display or both the monochrome display and a color monitor or television are connected to the system. When this setting is used, the system is initialized on the monochrome display. Other switch selections indicate that only a color monitor is attached. Logically, if you wished to have the system start by using the color monitor, it would seem that you could reset the switches to fool the system into believing that only the color display was present.

However, when a monochrome display is attached to the system, don't set the

system switches for a color display only. When the system switches are set for a color monitor, the required display initialization is not performed on the monochrome display. It is possible to overdrive the horizontal oscillator, overload the power supply, and damage the monochrome display. In this instance, smoke began rising from the top of the monochrome display, signaling its demise.

The only practical way to initialize on the color display is to include a software program in the AUTOEXEC.BAT file on the program diskette. And when using the monochrome display, you should not wait long for the display screen to come to life. After you turn on your PC, a long delay without the cursor present in the upper left corner of the display might indicate a defective cable or monochrome display adapter, which could damage the display.

Correct Copying

Q: Something very strange is happening with my PC. After formatting a dual-sided diskette, I observed that I had some 320,000 bytes of space available on the disk. I copied the new DOS 1.10 and a few more files onto that disk, only to find that I had run out of room. I checked the diskette again, using the CHKDSK command, and was surprised to find that I had only 160,000 bytes available, even though the format command told me that I had started with 320,000 bytes. What's going on here?

Janet Bauer
Los Angeles, California

A: While formatting a dual-sided diskette using DOS 1.10, you observed DOS report that almost 320K of diskette storage was available on that diskette. After using the Diskcopy command, you were unable to utilize all space available on the dual-sided diskette.

It's important to remember that a diskette is not recognized by the system as

dual-sided by virtue of its physical properties, but by its format. When using the DOS format command, the dual-sided format was properly installed onto the diskette. When you invoked the Diskcopy command, however, a mirror image of the source diskette was created and the original PC-DOS 1.10 diskette was formatted as a single-sided diskette. The DOS 1.10 diskette's files as well as its format were copied to the target diskette, destroying the original dual-sided format of that diskette.

You may have overlooked the fact that the new Diskcopy command in DOS 1.10 will allow you to copy a "source" diskette (on original you wish to copy from) without previously having formatted the target diskette (the one you wish to copy to). This feature makes a lot of sense since the original format of the target diskette is erased during the copying process. The message "formatting while copying" will be displayed during the Diskcopy process.

Here is the way to copy diskettes to insure that all the available space on a dual-sided diskette is utilized. Format the dual-sided diskette in a dual-sided drive using the Format command. Then, instead of using the Diskcopy command, use the Copy command to copy the files individually from one diskette to the other. The format of the original diskette will not be transferred to the dual-sided diskette. All the files on a disk may be copied from one diskette to another using global file names. If your source disk were in the A: drive and the target disk in the B: drive, you would utilize the command `Copy *.* B:` to copy all files from the source to the target disk.

Dualing Printers

Q: I'm using two parallel printers. One is connected to the monochrome display adapter while the other is connected to a Quadram Quadboard. VisiCalc allows me to output to either printer 1 (lpt1:) or printer 2 (lpt2:). How do I get WordStar to output to printer 2?

Richard E. Ozaroff
New York, New York

A: There is no easy way to switch from one port to the other for functions such as print screen or programs such as WordStar. However, there is a solution.

The following BASIC program may be utilized to swap the logical addressing of lpt1: and lpt2:. The physical ports that you're connected to will be accessed with the opposite parallel printer port numbers. In other words, parallel printer port 1 will be accessed with the command `lpt2:` in BASIC, and parallel printer port 2 will be accessed with the command `lpt1:`. Programs such as WordStar, which always outputs to port 1, will output to port 2 after using this program.

```
10 DEF SEG=>40H
20 A=PEEK(40H):B=PEEK(40H)
30 C=PEEK(40H):D=PEEK(40H)
40 POKE 40H,C:POKE 40H,D
50 POKE 40H,A:POKE 40H,B
60 LPTS="2":IF A=<40H THEN
  LPTS="1"
70 PRINT "Primary printer
  =LPT:"LPTS+"."
80 END
```

This BASIC program switches the parallel printer output and should be run prior to the execution of any program that will access the parallel printers. The second time the BASIC program is executed,

the printer addressing will return to normal (i.e., parallel printer port 1 will be accessed by `lpt1:`). If you include this BASIC program in a batch file, or AUTOEXEC.BAT file, be sure to change line 80 from "END" to "SYSTEM" so that the remainder of the batch file may be executed.

For those of you who are wondering how to figure out this kind of problem on your own, let me explain how I went about it. It is important to have some knowledge of assembly language. Having a copy of the IBM Personal Computer Technical Reference Manual is a must. By reading the manual I learned that input/output (I/O) functions are often handled by the Basic Input Output System (BIOS), though some programs bypass the BIOS and perform their own I/O handling. A complete listing of the assembly language BIOS, which is contained in ROM (read-only memory), is available in the appendix of the reference manual.

Section 3 of the manual includes a description of ROM and system usage. On page 3-6 information regarding the use of memory locations says that addresses 400h to 40Fh are where base addresses for

MONO.COM AND COLOR.COM

From colorchrome to monochrome and back again.

This BASIC program will create two program files on your DOS diskette in .COM format. The program named COLOR.COM, when run under DOS, will switch the video from the monochrome display to the color monitor. The program named MONO.COM will do the reverse, bringing you back to the monochrome display.

Load DOS and then Disk or Advanced BASIC. Enter the following program. Save the program on disk under a file name of your choice (just in case it doesn't work the first time you try it). Now run the program. When each file has been successfully created, "COLOR.COM CREATED" and "MONO.COM CREATED" will be displayed on the screen. If you made an error while entering the data statements, "ERROR—VERIFY DATA" will be displayed on the screen and you will have to recheck your work.

Now you're ready to run the COLOR.COM and MONO.COM programs. You won't need to run the BASIC program

again. The two .COM programs may be copied onto any other diskettes on which they may be needed.

```
10 REM ... CBM.BAS -- creates files
  COLOR.COM & MONO.COM
20 FS="COLOR.COM":T=0
30 FOR I=1 TO 22:READ N:C=C+N
40 NEXT:READ N:IF N<>C THEN 130
50 T=T+1:RESTORE:OPEN FS AS 1 LEN=1
60 FIELD 1,1 AS NS:FOR I=1 TO 22
70 READ N:LSET NS=CHR$(N):PUT 1
80 NEXT:IF T=1 THEN PRINT FS:"CREATED"
90 FS="MONO.COM"
100 IF T=1 THEN CLOSE:GOTO 50
105 LSET NS=CHR$(48):PUT 1,11
110 LSET NS=CHR$(7):PUT 1,16
120 PRINT FS:"CREATED":CLOSE:END
130 PRINT "*** ERROR - VERIFY DATA ***"
140 CLOSE:END
150 DATA 51,192,142,216,160,16,4,36
160 DATA 207,12,32,162,16,4,176,3
170 DATA 180,0,205,16,205,32
180 DATA 2067
```

—B.R.

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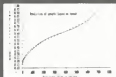
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• **GRAFTRAX** ^{PS/2} is a set of three plug-in Epson EPROMs which upgrade early models of the MX-80 and the IBM printer to provide graphics capability (MS-100's are standard with graphics capability). Includes Manual. \$58.

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the parallel printer adapters may be found. Page 2-67 discusses the parallel printer adapter and gives specific information about the addressing of the first and second parallel printer ports. The BASIC 1.1 manual (Appendix 1, page 7) indicates that when two parallel printer

A DISKETTE
is not recognized by
the system as dual-
sided by virtue of its
physical properties,
but by its format.

adapters are installed, the parallel printer port on the monochrome adapter becomes "lpt1:" and the separate parallel printer adapter becomes "lpt2:".

At this point I needed to know specifically how the addresses are stored in memory. By using the BASIC Peek command or the Dump command in DEBUG, I found that the printer port addresses are stored high-order byte first, 2 bytes per address, allowing for four possible printer port addresses. With this information it was easy to see that by swapping the printer port I/O addresses for printer 1 and printer 2, one could effectively redirect the output of each printer number to the opposite printer port.

The information just presented is useful to experienced programmers who are new to the PC. For those of you who are new to programming, try to follow the steps described and don't be afraid to try "peeking" and "poking" around your machine. Keep your important files safely on separate disks while experimenting but don't be afraid to explore. The worst that can happen is that you'll have to turn off the machine and start all over. /PC

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SEYMOUR RUBINSTEIN: *The Kingpin of MicroPro*

PC interviews marketing wizard, Seymour Rubinstein, founder of MicroPro and cocreator of WordStar.

During his more than 18 years in the computer industry, Rubinstein has designed software systems for applications in telecommunications, time-sharing, inventory control, banking, and professional organizations. Before forming MicroPro, he was director of marketing for IMSAI.

MicroPro International was established in 1978 with headquarters in San Rafael, California. Rubinstein set out to design software products that would enable the neophyte user to develop systems to meet specific business needs. This marketing strategy was put to the test when MicroPro's WordStar was placed on the market. Needless to say, WordStar quickly became the standard program in the field of word processing for PCs and one of several successes in software development.

Rubinstein continues to direct MicroPro's growth in other areas. MicroPro was the first PC software manufacturer to create an extensive network of dealer support offices and has recently opened a World Trade Division to reach markets outside the United States.

PC: When was WordStar first released?

Rubinstein: Robb Barnaby and I created

WordStar, and it was released by MicroPro in June 1979. Each of us had different backgrounds in terms of being able to determine what the marketplace wanted and how to provide that product.

PC: WordStar was not your first venture. How did you get involved in computers?

Rubinstein: I have been in data processing since 1964 and have had experience working for hardware manufacturers, software houses, and users. I worked on mainframe computers, the IBM 360 series all the way through the 360-3675, 3640, and 3650. I got into the very bowels of the machines, including machine stop and address stop, the total stand-alone use of those machines, and the operating systems. I learned to take them apart and put them back together.

PC: What was your first exposure to personal computing?

Rubinstein: I saw a new store called the Byte Shop of San Rafael. After a few visits and \$700, I had purchased an IMSAI personal computer kit. A week later I had a functioning computer. It was a thrilling experience because I had spent so many hours of my life in big, cold, brightly-lit rooms surrounded by enormous hunks of costly machinery. And here was this little thing that I could program in assembly



language and get out hexadecimal dumps. I was really amazed. After checking on the manufacturer, I gave them a call in San Leandro. A man who I met in 1968 and had asked me to join him in California, was the guy who was running the company.

PC: Is that Bill Mollord?

Rubinstein: Yes. One thing led to another, and I wound up going to work for him. Within a couple of months, I was promoted to IMSAI director of marketing, a post that I held on to for 1½ years until I started MicroPro. During that time, I was able to

learn a great deal about the burgeoning personal computer market. I had been through the cycle with the mainframe. I had also been through the cycle with the mini. The micro cycle was just beginning and I planned to jump right in.

Since I knew software development best, I started MicroPro with the specific purpose of building software for this market. It was a grass roots movement with few competitors. With the right products, I was going to get my company established, make a name for myself, and go on from there. And that's exactly what happened.

PC: Tell us more about MicroPro.

Rubinstein: When I started the company,



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THE
*Displaywriter and
the IBM PC are
basically the same
machine.*

I had less than \$85,000 in cash and a mortgage on my house. On June 5, 1978 I filed the fictitious business name statement, calling the company MicroPro.

PC: Didn't you start off calling it MicroPro International?

Rubinstein: Yes. I had quite a bit of business experience in Europe. I felt that with the right, well-designed products, Europe would be an approachable market. I had those plans from the outset.

PC: Was WordStar your first product?

Rubinstein: No, we marketed two products simultaneously, exemplifying the company's general approach. Presently we have two product lines. One is text management and the other is data. Our first two products were Wordmaster and Supersort. Wordmaster is still one of the best text editors specifically designed for high-speed, efficient use by programs. It is outstanding for creating and manipulating program text as well as ASCII-

based data files.

Supersort has just about every hell and whistle you could imagine in a soft-merge program. It emulates the best combination of mainframe software that I've ever come across. That's really what it was based on. It can sort up to 32 files concurrently and merge up to another 32 files. It can have up to 32 sort fields in intermixed ascending-descending sequence, intermixed collating sequences, and intermixed data types.

PC: Will they be translated to PC-DOS?
Rubinstein: Yes.

PC: If someone wanted to do word processing on a personal computer before WordStar was released, what could they have used?

Rubinstein: There were basically two choices: Electric Pencil and WordMaster, a text editor and a run-off program. At



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that time we were selling a superior run-off program called TextWriter.

PC: What was the initial cost to get a WordStar system up and running—hardware and software?

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Rubinstein: About \$10,000, depending on what you were willing to settle for. When we first came out with it, you could have gotten an S100 chassis, a disk drive, and what have you from any of six different manufacturers. The printer cost as much as the computer.

WORDSTAR

*has true depth to it;
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PC: Did you start cutting into the dedicated word processing market immediately?

Rubinstein: The dedicated systems were marketed rather than merchandised. I make a distinction between marketing and merchandising. Marketing is having a personal representative selling the end user on the virtues of the product. Merchandising is having storefronts, window displays, and anything other than people helping to make the sale.

PC: Recently someone from PC went to on IBM Product Center; he was shown the Displaywriter but not WordStar. Why was that?

Rubinstein: They make more money that way. The Displaywriter and the IBM PC are basically the same machine. There aren't many differences.

PC: If people are interested primarily in word processing, where should they go?

Rubinstein: I don't believe they would want only word processing. The reason I don't believe it is because a computer is, after all, a general-purpose device. Let's say I went along with you, and you're interested primarily in word processing. It seems to me that what you want is a display that is as pictorial as possible. One that comes to mind is the Xerox Star. The other is the Xerox 860. Both have full-page screens from which you can do a total page composition with font and other effects right on the screen—that is an optimal word processor. If you do anything less than that, you've made an economic compromise; once you've done that, you



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THE MICRO cycle was just beginning and I planned to jump right in.

should really look at other potential compromises.

PC: What market did you have in mind when you created WordStar?

Rubinstein: WordStar was first intended for the lowest common denominator, but the lowest common denominator did not have screen underlining. I wouldn't be surprised if you see this feature some time. As far as user-friendliness is concerned, the program has evolved in a number of respects. WordStar has one of the best user training guides in the business. I don't care whose product you are comparing it to; I think it is a superior product, and judging by its receptivity in the marketplace, others concur.

PC: To what do you attribute WordStar's popularity?

Rubinstein: WordStar has true depth to it; you can't exhaust its possibilities. You keep finding new things that you can do with this program. It is a very elegant program. A great deal of effort went into designing the specifications.

Many word processing programs allow you to move the cursor, but very few allow you to move the cursor anything but one character or line at a time. WordStar also allows you to move the cursor a word at a time, to one side of the screen or the other, or to the top or the bottom. It has an expanding series of cursor movements. Learning how to use these new features can really improve efficiency.

PC: Won't this require the use of multiple keystrokes?

Rubinstein: Not necessarily. It depends on the actual interface you have given the machine. The use of multiple keystrokes is not necessarily a disadvantage. We've made some observations about the original keyboard design and function keys. If the machine is used occasionally, function keys make sense. If the machine is used by a production typist, function keys are not what is needed. It's not possible to strike a function key and get your hands back in the home position without taking your eyes off the work to look at the keyboard.

Compare the levels of lighting in different parts of the work area. The screen is certainly lit, because it has its own light. The material you're working on is usually well lit, but there's almost always a shadow on the keyboard. The keyboard is the least well lit part of the system. You have to shift your eyes quickly under different lighting conditions while moving your hands around efficiently. Having to look for function keys destroys any aim at real productivity.

Hunt-and-peck typists will find that labeled function keys help familiarize them with the keyboard, but they don't really save time. If you have a menu on the screen and you know what you're looking at, using the keyboard's control key isn't particularly different from using function keys.

I'm appalled at the level of unconsciousness that exists in the marketplace with regard to function keys. Some engineer who didn't know how to type probably thought function keys would be a good idea. And all the marketing in conventional word processing has been directed toward people who also don't know how to type.

PC: But on the PC you activated the function keys. Why?



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Rubinstein: You might call it an experiment. What I just told you about function keys I've known for some time. But a company succeeds by selling people what they want, even if what they want is bad for them.

PC: Why don't you copy protect WordStar?

Rubinstein: We feel that relying on the force of the law is a better approach than depriving people of the ability to use the

company in Santa Clara called Dataforce actually took our program and renamed it Wordforce. They got away with it for a while, but then we killed them.

PC: Did they actually use your codes directly?

Rubinstein: They modified them, but the program was still fairly recognizable. WordStar is a very substantial program.

PC: I know of an accounting office that purchased one copy of WordStar for two or three machines. A neighbor downstairs even uses it. They're all operating on that same multipurpose program.

Rubinstein: If we catch them, we will sue, and the fines are very substantial. I'm not saying you can't get away with it. Some people even get away with holding up gas stations or banks. The same is true in our industry. We will pursue every reasonable case we encounter.

PC: Let's say you walked into an office and found two computers using one

WordStar. Would you consider that an infringement?

Rubinstein: It depends. If the company had paid for two licenses, no. But if they hadn't paid for two licenses, yes.

I MAKE A distinction between marketing and merchandising.

PC: Do you think people are hesitant to engage in piracy?

Rubinstein: I think that varies greatly. I would say that people who are more familiar with the law and the penalties are definitely more cautious. Businesses that are exposed to the public are probably more prudent. Certainly the bigger companies, with their corporate images,

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would be less likely to engage in that kind of piracy.

PC: Aside from legal and ethical reasons, what is the advantage of buying WordStar instead of copying it from a friend?

Rubinstein: For one thing, we will be putting in an end user service hot-line. We're also coming out with an end user newsletter. And there's also the matter of updates. None of those services are provided unless you are a registered user.

PC: How many installations of WordStar are there today?

Rubinstein: It depends on what you mean. Do you mean the ones that haven't been paid for yet?

PC: The legitimate ones.

Rubinstein: There are several hundred thousand.

PC: Is it the most popular program?

Rubinstein: It is definitely the most popular.

PC: What impact is the IBM PC having on personal computing?

Rubinstein: Probably the most important impact is legitimizing this product for industry. The process was initiated by Apple, to be sure, but IBM's entry into this business makes it possible for companies that are already involved in data processing to consider these machines viable for commercial use. IBM's entry is a very important issue that has far-reaching consequences for marketplace growth.

PC: What about personal computing entering the 16-bit world. Is that important?

Rubinstein: For what this class of computers was originally intended, I think it is relatively unimportant. There is simply no performance difference between an 8088-based microcomputer and the Z-88-based microcomputer that uses floppy disks.

PC: What about increased internal memory?

Rubinstein: That depends on what you're doing with the memory. A program such as SuperSort can be a real benefit because sorting and memory is faster. You can get more of the file in memory. In a program such as WordStar you can get more text into memory before it pages it out to the disk automatically. That can

also be more efficient. But in transaction-based accounting programs, in which you read a record here and write a record there, the difference is not perceptible. It depends on what you're doing.

PC: One thing that slows WordStar down is having to go back to the disk for program instruction.

**I'M APPALLED
at the level of
unconsciousness that
exists in the
marketplace with
regard to function
keys.**

Rubinstein: But with a hard disk we have found it unnoticeable. There's a real trade-off between a hard disk and RAM. Frankly, between you and me, I'd take the hard disk because I get so much more room and so much more bang for the buck. The only time you get bang for the buck with extra RAM is if you're going to run or test.

PC: Is the price of software coming down?

Rubinstein: We established our prices some time ago. The price to the end user comes down when more retailers who know how to sell our products in volume get into the marketplace.

PC: We hear some word processing programs for the IBM PC will sell for \$50. Is that true?

Rubinstein: If a company markets a program for \$50 and also invests in the kind of research and development needed to maintain the product's viability in the marketplace, it would be providing a tremendous philanthropic service. But you can't make money doing that, and businesses have to make money to survive. It's not like a book you write and publish and then keep printing until it stops selling. A word processing program does not have that stability in the marketplace. The competition places great demands on product innovation. /PC

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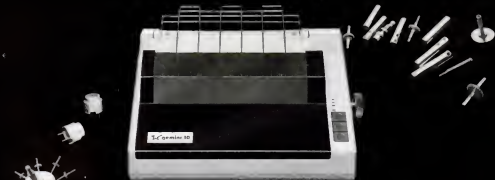
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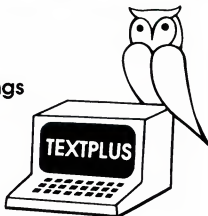
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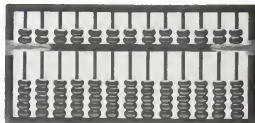
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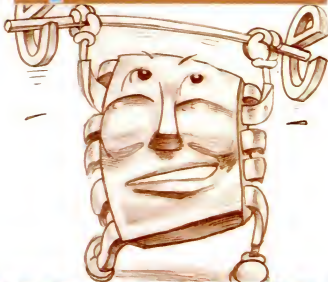
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PC Magazine Special Section



WORD PROCESSING

PC focuses on word processing: product reviews, tips for professionals, and information on topics such as the basics, hardware, and software.

If you've never used word processing, you are missing out on one of the best reasons to own a computer. People who produce written documents, whether personal letters, business correspondence, corporate reports, newspaper articles, or books, owe it to themselves to investigate word processing. Many writers have found that once they move from pen, paper, and typewriter to word processing, they enter a world in which they can correct mistakes without retyping pages, number pages automatically, change sentence or paragraph order as needed, and check spelling

against an electronic dictionary.

This month PC focuses on word processing. Topics range from word processing concepts, to hardware and software, to word processing as a profession. A book excerpt takes familiar writing materials, such as typewriters and even the ancient parchment scroll, and presents them as the basis for introducing the fundamentals of producing documents with computers. In the area of hardware, we take a close look at how easy (or not so easy) it is to use the PC keyboard, and we present discussions of characteristics, speeds, and prices of letter quality printers. For readers who are looking to buy a printer or want to test the speed of the one they have, we've included a printer speed test.

Our software section reviews seven word processing programs and other programs, such as spelling checkers, which make document production easier, faster, and more accurate. A special chart compares the features of 20 of the best known word processing programs.

For readers who are in the market for word processing software, we've included an article on selecting a word processing program. Another presents comments on the need to develop practical user-oriented tools for document production. If you're looking for ways to increase the usefulness of the PC, you'll want to read about how the PC functions as a typesetting system. And for those who are interested in word processing as a profession, we present information on organizations that employ word processing professionals and a glimpse into the work life of some of the pros. Another story of interest to professionals discusses the acceptance (or non-acceptance) by publishers of documents produced with dot matrix printers.

For newcomers and old hands alike, there's a lot to be learned about word processing. Whether you're interested in the basics or in the latest information on customizing the PC keyboard for your own word processing system, we're sure you'll want to read ahead.



Like the inspiration for its name, VW doesn't go in for lots of frills but performs essential functions very well.

Volkswriter 1.1: Camilo Wilson's Claim To Fame

Volkswriter
Lifetree Software
177 Webster St.
Monterey, CA 93940
(408) 859-5531
List Price: \$195

It was mid-January 1982. I'd been fooling with my IBM PC for almost 3 months. Version 1.00 of EasyWriter had shown itself to be pretty much a lemon, and no one knew when an IBM PC version of WordStar might roll off the assembly lines to the rescue. I was supposed to be using my computer to write a 100,000-word book, due in 3 months. Panic was setting in.

In the midst of this despair the phone rang and a voice introduced itself with a lyrical accent: "My name is Camilo Wilson; I've just written a word processing program. Would you like to try it?" Was it possible that while I was simply complaining about the lack of word processors for the PC, someone else had mastered IBM's Pascal compiler and actually written one?

It was possible. I was introduced to

the program that was to become Volkswriter—and my salvation. The writing project was completed more or less on schedule, thanks to the timely appearance of Wilson's program and the reliable service it provided.

Now, 9 months after that blessed phone call, EasyWriter has been recalled and corrected, WordStar and a host of other writing vehicles are filling the showrooms, and Volkswriter may no longer claim the distinction of being the only fully functioning word processor available for the PC. But for ease of use, performance, and versatility, it leads the pack in the word processor Grand Prix.

Program Requirements

Volkswriter (VW) runs under PC-DOS (version 1.00 or 1.10). While you can get by with only one disk drive, two drives (single- or double-sided) are recommended. And while you can run VW perfectly well with 64K of memory, you should have more memory in your system to make the best use of the program.

The reason for the memory recommendation is that VW loads the entire

Update: Here Comes Volkswriter 1.2

Hold the presses: VW introduces a new model.

After the accompanying review of Volkswriter had already been sent to the typesetter, Lifetree Software, the manufacturer, announced a revision of VW—version 1.2. Without seeing the review, the Lifetree people addressed almost every one of my major criticisms. This is why software reviewers and magazine editors (and writers) age prematurely, and why you, the consumer, benefit from fierce competition for your business and loyalty. We decided to leave the review of version 1.1 intact. Following are improvements in the latest version of Volkswriter.

- You can now embed an unlimited number of headers and/or footers on each page, on any line, with the options of justifying left or right, centering, or alternating left and right justification. Automatic page numbering can be included as part of the text of the header.
- Consolidation of the program has increased the maximum file size (with a 64K system) to about 15,000 characters. I would still recommend 128K of RAM to take full advantage of the program.
- The new program permits printing of a file from the major edit mode without re-retrieving the file. This helps bridge the gulf between editing and printing modes. More significantly, the manufacturer now offers a program that combines all editing and printing features. This combined version requires 128K of

RAM. If you have that much system memory, request this version; it works much more efficiently.

- VW 1.2 permits temporary indentation of the left margin on a paragraph by paragraph basis. This makes it a little easier to produce outlines and reports.
- Program commands are now buffered so you can enter several commands in rapid succession.
- The program has been made compatible with more printers, including the Epson MX80-III, NEC 8023-A, NEC Spinwriters, Smith Corona TP-1, and Brother HR-1.
- The best news of all is that version 1.2 will not be copy protected. Another victory for the forces of good.

Lifetree will supply the new version free to anyone who purchased the former program after September 1, 1982. Those who purchased VW prior to that date can receive version 1.2 for a \$20 update fee. Registered owners will be contacted by Lifetree.

Are there any disappointments left? Not too many. The new Volkswriter still limits lines to a maximum of 80 characters. I would like to see more exotic editing and formatting features. Despite my curses for the last-minute notification, this new version is a dandy. That MG convertible just turned into a Porsche. —A.F.

into memory during editing and printing operations. Since the program itself guzzles about 45K (depending on function) and DOS requires about another 8K, only about 12K of memory is left for text. In a 64K system running DOS 1.10, VW can edit a text file of up to 13,362 bytes and print a single file of up to 9,392 bytes. There are ways to create and print larger documents, but if you have only 64K of memory, editing text files longer than about five double-spaced manuscript pages becomes impossible. With 128K or more, VW's maximum file size becomes a very comfortable 59,880 bytes—about 40 manuscript pages.

Other word processing programs may impose less severe limitations with 64K,

but they also require more than 64K to work at their best. And as you'll discover, VW compensates for its memory appetite by performing like a champion speedster.

Using and Learning

VW may be short on the frills, but it is extremely friendly, logical, and easy to learn. The command menu clearly states the initial program options (see Figure 1). In the editing mode, all functions are invoked with the ten special function keys and the ten [Alt]-function key combinations (see Figure 2). On-screen reference to these 20 commands is no further than pressing [F1]. For a first-time user these single-key commands make for a smooth transition to electronic writing.

Volkswriter also offers an on-screen tutorial that provides a clear orientation to both the editing features of the program and word processing concepts in general. The program manual is brief, conversational, comprehensible, and handsomely printed. If I needed to have a novice using

VOLKSWRITER's
*block move function
is as fast as a drag
racer.*

a word processor within an hour, VW would be my choice. I also suspect that Volkswriter is an ideal program for introducing children to word processing.

Editing

Once you start writing or editing with Volkswriter, you'll be struck by its most impressive feature—speed. There is hardly an editing function that doesn't execute immediately upon command. VW responds fast because the whole text file is loaded into memory and because it writes revised information directly to the screen's memory map rather than "typing" revised text to the screen. Scrolling up or down a screenful of text or the entire text file occurs with no noticeable delay. I was amazed the first time I experienced this responsiveness.

The necessary editing commands are all provided. The cursor can be moved a character or a word at a time and to the top or bottom of the screen. Text can be scrolled by half or full screenfuls. Insertions are squeezed into the text a character at a time at the cursor position. There are three delete possibilities: delete character at cursor position, delete to end of word, and delete to end of line. All of these functions operate without delay.

One quirk that poses a slight inconvenience occurs as you move the cursor past the last character displayed on a line. Moving the cursor forward sends it further along the blank portion of that line, rather than wrapping it immediately to the next line. Similarly, moving the cursor back one character from the beginning of a line sends it to column 80 of the previous line

rather than to the last character on the previous line. To make the cursor wrap immediately, hit [Ctrl]-[cursor right] or [cursor left] and jump to the next word.

As with many word processors, paragraphs can become fragmented when characters are inserted into previously written text. There's a conventional Reform command for realigning them that operates from the cursor position to the end of the paragraph. This is an instantaneous operation. The present version of the program preserves the integrity of indentations and spaces within the paragraph during reformatting.

VW's block move function is as fast as a drag racer. Blocks of text can be moved or copied within the file in microseconds, regardless of the size of the block and without any superfluous commands. However, blocks can be marked only in whole-line increments; you cannot isolate and move words within a line or shuffle sentences within a paragraph. This limitation is really more conceptually annoying than practically inconvenient.

The find and replace functions are also efficient and fast. You can search for each occurrence of a string of characters as well as replace a string with a substitute, either selectively or globally. There is no provision for ignoring case during searches, so you will not find "Personal" if you're searching for "personal." The remedy for this is to search for "ersonal."

An interesting feature of the program is that it starts its search wherever the cursor is positioned in the file, continues to the end of the file, and then loops back to the beginning to continue the search. A handy feature is that any character can be searched for, including control and high-bit characters.

Control characters are those with ASCII values less than 32; high-bit characters are those with ASCII values between 128 and 254. Any of these can be entered by holding down [Alt], typing the desired ASCII value on the numeric keypad, and then releasing [Alt]. This capability is built into the PC's keyboard routine, but Volkswriter supports it by allowing these control and high-bit characters to be entered into the file being edited. VW displays these according to the standard PC graphics character set.

The only screen formatting control offered is the ability to set the right margin to

a maximum of 80 columns. There is no provision for automatic indentation or varying of the left screen margin as opposed to indentation while printing.

Each of these functions is invoked with a single, special function key, resulting in a command efficiency that further enhances speed. The total effect is of an almost effortless, instantaneous writing tool. When I'm in the editing mode, I feel like I'm driving a Formula One machine rather than a Beetle.

Printing

When it comes to printing files, Volkswriter gets both high and low grades. It receives honors for its comprehensive method of setting and storing print formats. When it's in printing mode, you can call up a menu that displays all the active printing parameters (see Figure 3). You can use this menu to check the parameters or you can revise any or all of them by proceeding down the menu.

The real beauty of VW's format system is that each modified format can be given a name, such as LH.FMT, and be stored as a file on disk. You can then recall this format file, putting into effect all the parameters with a single command.

Making use of this feature, you can create and store separate "canned" formats for each of your writing applications: a let-

THIS PROGRAM
*is not going to veer off
and leave you in a
ditch.*

terhead format file for correspondence, a draft manuscript format file, single- or double-spaced format files, envelope and label format files, and format files with different margin and type style settings. You can also create a special format file, VW.FMT, which is implemented as the default printing format when the program is loaded.

A further advantage is that you can invoke these saved format files by embedding format instructions within a text file. Thus you have the ability to change all the printing parameters with a single embed-

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Figure 1: Command Menu

VOLKSWRITER EDITOR - CHOOSE AMONG THE FOLLOWING COMMANDS

D - DISPLAY ALL FILES	S - STORE FILE ON DISK	N - RENAME FILE	P - PRINT
R - RETRIEVE DISK FILE	F - FORMAT SELECTION	Z - DELETE FILE	X - EXIT
E - EDIT CONTENTS	C - CLEAR & START OVER	H - HELP	

YOUR CHOICE:

ENTER DRIVE: A

DIRECTORY FOR DRIVE A

PWPWPWPW PWP	WN2.BAT	VW1.BAT	VW2.BAT	WN1.BAT
VM.BAT	AUTDEXEC.BAT	VW.FMT	VW1.EXE	VW2.EXE
TUTORIAL	TUTOR2	TUTOR3	DATE.COM	COMMAND.COM

Figure 2: Function Key Reference Guide

KEY:	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
BY ITSELF:	HELP	FILE	+LINE	-WORD	BLOCK	BLCKC	FIND	REFORM	TAB/MARG	RESET
WITH ALT:	PRINT	FILE	+PAGE	-LINE	MOVE	COPY	REPL	-BLOCK	CENTER	EXIT

This tutorial shows you how to use the volkswriter editor. Notice the blinking line, called the CURSOR, on the upper left-hand corner of your screen. The cursor shows where within your text you are.

To do anything, you must first move the cursor to the appropriate place in your text and then carry out your action. It is therefore important to know how to move the cursor. Look at the numeric keypad on the right side of the keyboard, which looks like the figure to your right. Besides a number, each key has an arrow or a word printed on it. These are called the cursor control keys and they are used to move the cursor around the screen.

To begin, press the key, and see what happens. The cursor
should have moved down one line. If you see a '1' instead, 7 8 9
press the 'Num Lock' key, on the upper right of the keyboard 4 5 6
and try again. 1 2 3

ded "dot" command such as .LH.FMT. You should certainly devote an afternoon to devising personalized format files and then store them on a program disk for instant use.

Now for my major disappointment with Volkswriter: There's no provision for printing headers or footers on each printed page. The print routine can be instructed to number each page automatically (centered on a specified line), but that's all. When I first started using the program, I figured, "Oh well, I'll just forget about the headers," but I've repeatedly run into writing applications that required at least one available running head. I'm not using VW to write this article, partly because it won't let me print "PC/Volkswriter Review" at the top of each page.

A minor inconvenience is that you can't proceed directly from full-feature editing to printing a document. Volkswriter is actually two separate programs. VW1.EXE

contains all the editing features described but can't print files. VW2.EXE contains the printer driver and minor editing features but does not afford the block move and find and replace functions.

These two parallel programs are connected via batch files that call each other, so that when you exit one, you are sent to the other. This happens automatically, but in the process you have to wait while the companion program is loaded from drive A:, and you must manually reload into memory the file you were editing. This takes an eternity of about 10 seconds and a great deal of concentration. It can be more than moderately bothersome, especially once you've been spoiled by the exceptional speed of other VW functions.

The reason for this inconvenience is that if both the editing and printing features were combined into one program, there would be no room in memory for text with a 64K system. As it is, VW2.EXE

doesn't leave much room for text. According to Wilson, IBM Pascal provides no method for chaining programs and passing parameters.

There is, however, no limit to the total length of a final printed document with Volkswriter. VW offers a ..PRINT command similar to the embedded ..FORMAT command that can call up and print another text file from disk while printing a document. This lets you include "boilerplate" paragraphs from separate files during a print routine.

You can even create a command file with just ..FORMAT and ..PRINT instructions. It will print a series of separate disk files as a composite document. There's also a ..PAUSE instruction that enables you to change disks during these chained printing operations. This system of independent formatting and printing commands offers great versatility in the creation of long documents or specialized print formatting that largely compensates for the lack of on-screen formatting options.

VW supports the essential features of IBM's matrix printer and the NEC Spinwriter series printers as well as other printers, both parallel and serial. Underlining is accomplished by letting you create supplemental lines of text that terminate with a carriage return and no line feed. As with any word processor/printer interface, you should personally test the

printer you plan on using to see how well the program supports it.

VW allows you to insert forced page breaks within a text file, and there is a provision for printing a file to the screen so you can preview print formatting and page

***If I NEEDED
to have a novice using
a word processor
within an hour,
Volkswriter would be
my choice.***

breaks. Unfortunately, you can't insert or adjust page breaks while previewing.

The printing portion of the program consists of some extremely versatile features with a few glaring omissions. When printing, Volkswriter reminds me of those Volkswagen models that could go anywhere but didn't have trunk locks.

File Management

In the area of file management Volkswriter shows itself to be the trusty, reliable Beetle of word processors for several reasons. One is that VW reads and writes truly standard DOS files of ASCII

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Figure 3. Format Selection

IM FORMAT SELECTION

ENTER CHOICE:	CURRENT FORMAT	U-USE THIS FORMAT	R-RETRIEVE STORED FORMAT
		N-MODIFY THIS FORMAT	S-STORE FORMAT FOR LATER USE
PRINTER TYPE (1=IBM/2=NEC/3=OTHER)	:	2	
RESET TOP OF FORM (Y/N)	:	Y	
PAGINATION (Y/N)	:	Y	
FIRST TEXT LINE	:	6	
LAST TEXT LINE	:	60	
PAGE #'S (Y/N)	:	Y	
PAGE #'S ON LINE	:	63	
STARTING PAGE NUMBER	:	1	
EXTRA SPACING BETWEEN LINES	:	0	
LEFT MARGIN	:	16	
LEFT AND RIGHT JUSTIFICATION	:	N	
CONTINUOUS FORMS (Y/N)	:	Y	
LINES / PAGE (2-255)	:	66	
LINES / INCH (6/8)	:	6	
HORIZONTAL MOTION INDEX	:	9	

characters. Other word processing programs make that claim, but upon examination their text files contain special headers or formatting codes that require conversion of their text files before they can be edited (EosyWriter version 1.10, for example). Other programs offer the creation of unembellished DOS files as an option but don't provide reformatting and word wrapping in DOS mode (WordStor, for example).

Volkswriter text files consist of lines of ASCII characters, each terminated by a carriage return and line feed (ASCII 13 and 10). The end of a file is marked by a Control-Z (ASCII 26). This is the same convention used by DOS when creating a file with the COPY CON: command or with EDLIN. Technical explanations aside, the bottom line is that VW is a welcome replacement for EDLIN in most circumstances and the perfect tool for creating

batch files, Pascal programs, and data files read by BASIC.

The VW manual also claims that VisiCalc print files can be read and inserted into text being edited with VW. Although I have not tested this, I have tried using VW to perform search and replace operations on BASIC programs, with unsatisfactory results.

You will encounter only two nonstandard characters in a VW-created file. If you're making use of paragraph reformatting, the end of each paragraph will contain a Control-T (ASCII 20). There is an optional command for dispensing with reformatting, thereby eliminating insertion of the Control-Ts. If you've made use of underlining, you'll have extra lines that terminate with a carriage return. Because of this standardization, I've frequently used VW to create messages I wanted to post on network bulletin boards and for composing files to be read by BASIC programs. I write the file with the regular reformatting feature in effect. When the document is in final form, I do a global replacement of each Control-T with " " (no character), which strips the Control-Ts.

VW provides a very limited ability to deal with lines of text exceeding 80 characters. You cannot write files with lines longer than 80 characters. You can read in an ASCII file created by another program with lines of up to 254 characters in length, but the screen will display only the first 80 characters of each line. If you reform the file, the invisible lines can be brought into view, but you still can't expand the file past the 80-character-per-line limit. The major impact of these limitations becomes apparent when you try to edit a BASIC file with multiple statements on lines longer than 80 characters. It's just not practical to use VW for this purpose.

VW's file management operation is a "name it later" system. You can edit a file first and give it a name when you're finished and are ready to store it. You can store the file under its previous name (if any) or give it another name (including a different drive designation). These file-naming options are complemented by both VW's ability to read another disk file into the file presently being edited and its capacity for marking a portion of the file being edited and writing it as a separate disk file. If you make creative use of these functions, you have maximum flexibility

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for moving files among your disks and within your system.

You can also rename or delete files from within the program's file command menu. The one operation not provided is concatenation of files; to accomplish that, you have to exit to DOS (version 1.10). VW does not automatically create backup files.

VW is close to being catastrophe-proof. Through a comprehensive system of warnings and error messages, you're virtually prevented from accidentally abandoning a file without having saved it to disk, or from running out of memory or

not been saved.

Occasionally, when invoking a format file, for example, you are required to enter a file name but have no way of seeing the files on disk for reference. By the time you've exited to the file directory and returned to the format selection prompt, you may have forgotten whether it's LH.FMT, LTR.FMT, or LTRHD.FMT and may need to go back to the directory for another look.

I've also found that working through the various print and format selection menus seems to take more steps than should be necessary. This is the one place

in the program where the gears don't seem to shift smoothly.

I prefer buffered commands, as offered by many other word processing programs. When you type **R** to retrieve a file, you have to wait a moment for the WHICH FILE: prompt, then enter your file name and wait for the file to be loaded from disk, then enter **E** at the YOUR CHOICE: prompt to edit. It would be wonderful to be able to type **R MYFILE <ENTER> E** in one swoop. No matter that the required wait takes less time than it used to take to load a sheet of paper into a typewriter. The

YOU SHOULD
*personally test
the printer you plan
on using to see how
well the program
supports it.*

disk space. Although veteran users might wish to bypass these "seatbelt" routines, they certainly make sense for novice word processing writers and even for complacent vets.

Efficiency

All the parts of this program are generally well integrated. Finding your way within the program is fairly easy, and the various work modes (editing, printing, filing) connect logically. One of the few rough spots, however, is the demarcation between the editing and printing modes previously noted.

A few hints for dealing with editing/printing transitions: You can enter either the editing or printing portion of the program directly by giving the commands VW1 or VW2, but upon exiting you will not be sent to the other program mode. As explained in the manual, you can rewrite VW's batch files so the program takes you into the printing mode first. Just substitute VW2.BAT as the last command in the AUTTOEXEC.BAT file on the program disk. The manual does not explain that you can exit directly to DOS by typing [Ctrl]-2 from the main command menus. Be careful, though, as you will lose any files that have

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computer age makes one increasingly impatient with such delays.

Outstanding Features/ Impediments

VW's noteworthy features have already been elaborated: ease of use, speed and performance, and file versatility. Another outstanding feature is that it works. This program is not going to veer off and leave you in a ditch. You can count on that.

Volkswriter's primary impediment is that it's supplied on a copy-protected disk. With double-sided drives available for the PC, and electronic and hard disks becoming more commonplace and affordable, VW's copy protection feature renders the program incapable of being integrated within a larger computer system. The present copy protection schemes are just not compatible with the state of microcomputer technology. This judgment is based on purely practical rather than economic or moral considerations. The only real so-

lution is for users to encourage software producers to offer unprotected programs by paying for the ones that they use.

Aesthetics

This program looks good. The menus are informative, attractive, and are not intrusive. The prompts are helpful and friendly, if a bit colloquial. VW beeps at you when it needs to, but not gratuitously.

I'd rate VW a perfect 10 in terms of aesthetics, were it not for the razzle-dazzle start-up display that performs micropyrrotechnics to proclaim "Welcome to your Volkswriter." I was amused the first few times, but when I'm in the mood to write, I'd rather get down to business. Once into the program, however, VW has style.

Best Use

Some of the best uses of VW have been touched on in the course of this review. Its streamlined and speedy operation make it ideal for general correspondence. If you

have more than 64K of memory, VW is a good tool for producing longer manuscripts. The paucity of print formatting options limits its usefulness in preparing complicated documents.

The DOS file compatibility makes this program a fine general-purpose system and program editor if you have more than 64K. The availability of the full PC character set makes VW useful for foreign language or special programming language applications. The simplicity and reliability of operation make VW a very good introductory word processor.

It's tempting to conclude by affirming that Volkswriter is like a Beetle. At the risk of overextending the metaphor, I feel that the program is a bit sportier than a Beetle. Perhaps it's closer to an MG convertible. Regardless, there's no doubt that Volkswriter would fit well in the family garage (one- or two-car), and that you can count on it to get you around town while providing some fun to boot.

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The 1982 Volkswriter

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*to this program make it a
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Volkswriter always had the best price/performance ratio of any of the word processors around. This is because Volkswriter's author, Camilo Wilson, has always intended to sell his program to the bottom 80 percent of the word processing market. And like the popular Volkswagen of the auto industry that has progressed from the standard Beetle to the sportier Rabbit, the new version, Volkswriter 1.2, has major changes and deserves to be notated in a more auspicious way than as an update of 1.0 to 1.2. Volkswriter now leaves little to be desired. Current users may get this update for only \$20. Furthermore, Volkswriter is no longer copy protected. The user can make backup floppy disk copies or copy onto either a hard or an electronic disk.

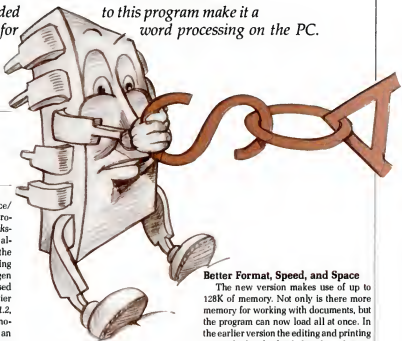
Improved Etiquette and Performance

Volkswriter 1.2 is even more user-friendly than Volkswriter 1.0. For example, when an error is made, Volkswriter now says on the status line "Beg your pardon," instead of the previous "Sorry, but how." Many word processors with their cumbersome manuals are difficult to master, but the computer-aided instruction of Volkswriter 1.2 makes learning a breeze. The manual, improved with high-quality type, and the on-screen, self-contained tutorial enable the user to become fairly proficient in under 2 hours.

Volkswriter was the first word processing program written specifically for the

PC. Any program written specifically for a given computer is normally superior to one transferred from another system since it can take full advantage of the inherent capabilities of the specific hardware configuration. The original PC version of WordStar did not use the function keys. Volkswriter utilizes them to great advantage. Wilson not only included the ten commands of the function keys, but also combined the Alt key and the function keys to create an additional ten commands. You need only a few keystrokes to perform any desired function.

Volkswriter can be used in conjunction with Edlin, BASIC, Pascal, Macro Assembler, VisiCalc, SuperCalc, dBaseII, Spellguard, and Eosyspeller. Applications programs can be printed out as files with word processing under the command of Volkswriter. This is a great feature if you are writing a letter or report and want to include part of an electronic spreadsheet in the text.



Better Format, Speed, and Space

The new version makes use of up to 128K of memory. Not only is there more memory for working with documents, but the program can now load all at once. In the earlier version the editing and printing modes had to be loaded and used separately. Now both modes load into memory as soon as the PC is turned on. The speed of the program has added to its already excellent price/performance value. Now when you buy Volkswriter, you get a 64K version and a 128K version.

The primary format is also automatically loaded as soon as the PC is turned on, further increasing the speed of Volkswriter. This customizable format includes tab settings, margins, and printing parameters, as well as those features that are unique for a particular printer. The printing instructions include pagination preferences, the amount of spacing between lines, and the number of lines to a page. You can now use many different formats for specific types of word processing that will load automatically when calling for a file with the specified format. If you were writing a script, for example, you would create a format called FMT.SC. When you call up files Scene1.SC, Scene2.SC, etc., each of these print automatically with the

Biography of an Entrepreneur

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correct format. This feature eliminates the tedious task of specifying the parameters of the format each time they are used.

Wilson has added column and line numbers to the status line. The status line, the highlighted area at the bottom of the screen, tells you which disk drive and file you are working on. Other commands, such as Find and Replace, are displayed on the status line. The percentage of available memory is also displayed. *Volkswriter* is easier to use now that column and line numbers have been added. Previously, you had to count manually to find a tab stop. Column numbers are helpful in setting up indented columns, gauging the number of completed pages, and knowing your position relative to left and right margins. However, *Volkswriter* still does not have the Spellbinder feature that enables you to use the command mode to go backwards and forwards to any given line number.

Setting the right margin to 80 disables the word wrap feature. This is advantageous for programming, as no automatic reformat will occur when the end of the line is reached.

New Design Features

Volkswriter 1.2 has newly designed tab features. Capital tab gives you an indented tab that will act as the current left margin until you press the Return key. After Return, you are back to using the original left margin. The creation of a temporary left margin is extremely handy in doing any kind of outline material. Using capital tab and the insert mode in conjunction has the advantage of creating a unique format that will type two lines, the first of which is indented according to the tab stop. There is a space of approximately four lines before it prints an additional two lines.

The page break can be set where you want it. Your text will not be broken in an awkward manner by use of this conditional page break. If you want the next six lines printed together, *Volkswriter* will break before or after these six lines but not in the middle of them. This feature is desirable if you want to have pages arranged according to paragraphs or sections with titles. It is especially helpful in the preparation of lengthy reports.

Volkswriter now has headers and footers that can be set on the left, right, or center of the page. Page numbers may be

Mild-mannered Camlin Wilson is an example of the entrepreneur in development. His word processing program, *Volkswriter*, has sold several thousand copies since it entered the marketplace 7 months ago.

Wilson was born and raised in Santiago, Chile. He came to the United States when he started high school in Oakland, California. This is where he was first exposed to computers. The summer before starting college at the University of California, Berkeley, he received a National Science Foundation scholarship.

For 7 years Wilson worked at the Survey Research Center doing relational data base analysis on large mainframe computers about equal in computing power to today's PC. He developed his first word processor because he did not own a typewriter but had access to computers at the center. His data base experience got him consulting jobs in educational institutions with the Ford Foundation in South America. From 1972 to 1976 he left the world of computers to work for the Arica Institute, which was part of the human potential

movement. It tried to integrate individual freedom with social responsibility.

When Wilson left Arica, he had worked his way up to the board of directors. He reentered computing as a consultant to Wall Street firms on the development of software systems. His work in mainframe financial applications included clients such as Chemical Bank, Blue Cross, Blue Shield, and American Express.

Wilson moved to San Francisco 1 1/2 years ago to work for Crocker Bank on telecommunications order entry systems. He started teaching data processing at Golden Gate University and Wells Fargo Bank. His teaching career was curtailed when he got involved with the PC. He signed a contract to write a book on the IBM PC and received one of the first PCs in California. As he started to write the book with *EasyWriter*, it was apparent to him that he had to improve the word processing capabilities of the PC. The book never got written, but *Volkswriter* was born. Now Wilson has put his expertise to work on a CP/M-86 version. —N.Z.

at the top or the bottom. You may alternate page numbers with even on the right side of the page and odd on the left. The page number may be printed between dashes. The number 1 is no longer printed automatically unless it is requested. These are some very useful features, especially for an author.

A new command, *Verbatim*, permits full use of all the special characters on many printers, such as the Epson MX-100, as well as all potential graphics and foreign language symbols. All you need to do is use Ctrl and type the ASCII number. Another new printing capability provides superscripts and subscripts, which are especially useful in printing formulas and equations.

Printing Support and Insert Mode

Volkswriter now comes with support for nine different printers. Wilson has made the commitment to support any printer if you send him a copy of your printer's manual. I think his is the only software company that gives this important support for word processing.

The insert mode is improved because a small graphic symbol no longer resides on the status line. You know when you are in the Insert mode because the cursor is no longer a little dash, but a solid square. The high visibility of the solid-insert cursor is useful when scrolling through the text to locate a particular word or phrase. *Volkswriter* still does not have true proportional spacing. The only advantages *WordStar* has are horizontal scrolling with lines more than 80 characters in length and showing page breaks on the screen.

The *Volkswriter* 1.2 has many convenience features. It has gained speed by not having to load from disk when switching from the Edit to Print modes. The features of this update make *Volkswriter* even more useful. /PC

Neil Zochary is a director of cinematography in Hollywood, California. He is also president of the IBM User Group of California and has incorporated information from user group members in his *Volkswriter* review.

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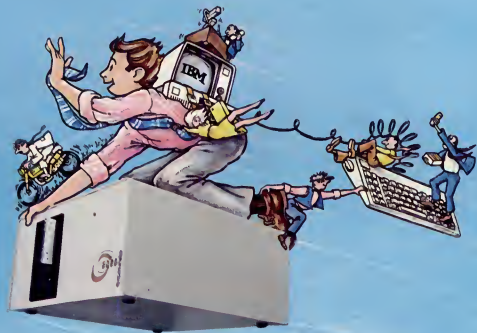
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Ask if Wordstar gives you all these features. (It doesn't.)

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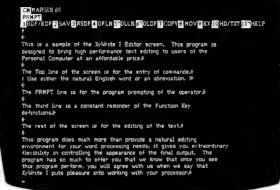


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The Word Worker

The Word Worker may be worth more than its \$29.95 sticker price. Try it and see what you think.

The Word Worker

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Write, Edit & Print

List Price: Paperback \$24.95, hardback \$34.95

Program and book by Donald H. McCunn
Design Enterprises of San Francisco
P.O. Box 14695
San Francisco, CA 94114
(415)282-8813

What is the difference between The Word Worker word processing software for \$29.95 and the "Stars," "Selects" and "Easy" brands for \$499.95? In cold cash about \$470, but in editing and use, a lot of inconvenience.

The Word Worker is, quite frankly, a bit of a pain to use for any lengthy job, but it works. This review was composed, edited, and printed on an IBM PC operating under The Word Worker program. I can't say I fell in love with it, but I'd give it a 10 for value and good intentions.

Perhaps the most unusual aspect of the software is that it is written in BASIC. It is not encrypted or copy protected, and it can be listed and modified by the user.

About the \$29.95 price: That is the cost for a single disk containing the programs, a sample copy, and a skimpy instruction booklet. It would take dedication and experimentation to learn to use the software with the package alone. But for \$24.95 you can buy *Write, Edit & Print: Word Processing with Personal Computers*, a book by Donald H. McCunn, author of The Word Worker software. Not only does this hefty 526-page book take you step-by-step through the operation of the program, it also provides a complete program listing. Along the way, it gives one of the clearest and most intelligible explanations of a complex BASIC program I've seen. The book is worth its price just to get some idea

of how a word processing program works.

I recommend that you buy the book before the program. If you've got the time and want to enter the program onto a disk yourself, you'll be all set. McCunn breaks

I RECOMMEND
*that you buy the book
before the program.*

the program down into small modules for entry, allowing you to run individual segments and proofread as you go.

The book also contains an evaluation and comparison of various personal computers and printers, including the IBM PC. McCunn rated the PC number one in terms of disk storage and retrieval speed, edging out the PET/CBM, and easily outdistancing TRS-80 and Apple II products.

The book offers a good overview of BASIC and a comparison of the language as implemented on several computers.

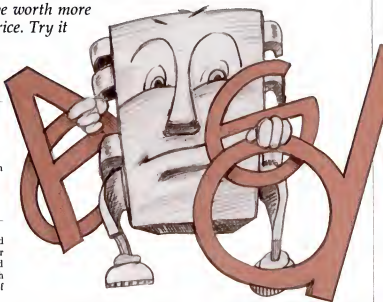
The Word Worker is listed as a generic program, so the book gives the necessary conversions to install it on the IBM PC, the Apple II, the TRS-80, and PET machines, as well as a BASIC-80 version.

Program Requirements

The Word Worker for the IBM PC requires 48K of RAM, but 64K is recommended. PC-DOS and BASIC also are necessary, as well as four DOS disk utilities: CHKDSK, Format, Diskcopy, and Command.

The Word Worker may be the only word processing software for the IBM PC that can use a cassette recorder for loading the program and storing copy. However, the program is not available yet on cassette, so the user has to type it in.

In the disk version, the software will operate on a single drive without complaint. However, the size of the program, the associated BASIC, and the DOS utilities total more than 106,000 bytes, so users with single-sided drives will quickly run out of space. One solution is to load BASIC and the utilities from the separate DOS disk as needed.



The Word Worker is divided into four modules. One is a basic word processing segment called BASICWP, which is designed for letters and short documents, and includes some simple editing and printing commands. Another is an extended writing program called Write, which is intended for longer and more complex jobs, and permits chaining of files for editing and printing functions. The third is an extended editing module called Edit, for inserting new lines, deleting, reformatting blocks of copy, simple searching and replacing, and other tasks. The fourth module is an extended printing program called Print, for the output of drafts and final copies.

Best Use of the Program

The Word Worker performs as a capable, if awkward, electronic typewriter, reminiscent of the original IBM magnetic card typewriter that preceded the word processor and is still found in many offices. It relegates the PC to a line-oriented input and editing typewriter with a huge memory and the ability to make some fancy pages.

If the user is working from a rough draft or retyping from written copy onto the screen, The Word Worker should do the job. Composing on the screen is somewhat difficult, however, because of the program's limited editing functions.

I missed the ability to skip around using a cursor or a special control character, but I discovered that the PC version on disk

A Marketing Revolution

Author Donald McCunn speaks out: Brainstorming The Word Worker.

The Word Worker is a word processing program that has a specific marketing philosophy. The idea, according to author Donald McCunn, was to come up with a program that is inexpensive, is not written by and for technically oriented people, and is user adaptable for specific tasks. "The Word Worker is designed," said McCunn, "so that a writer can make it work exactly as he or she wants it to, or so a secretary can have a program that will automatically perform a specified, ordered series of tasks on a particular type of document."

McCunn said that distribution efforts will center on bookstore sales; outlets will be encouraged to handle both the disks and the Write, Edit & Print book. He said that copies will be available through some B. Dalton bookstores, smaller chains, and his own company.

"We feel that future software will easily be under \$100," McCunn said. "The manufacturing cost of a disk is minimal. What the manufacturers are charging for is development and support. Our support is the book."

"Development costs for The Word Worker were kept to a minimum," McCunn said, "because the program is written in generic Microsoft BASIC. Only about 1 percent of the program is machine-specific."

Two more books and two more sets of programming modules are planned for the WEP series: Automated Processing of Contracts, Forms, and Mailing Lists, and The Word Processing-Typesetting Interface are the two books. McCunn is also the author of Computer Programming for the Complete Idiot, which claims to explain BASIC for microcomputers.

—C.S.

allows the user to make quick spelling corrections and word changes to lines on the screen by hitting the Ins key and specifying a line number. However, to add, delete, or find and replace lines, the user has to leave Write, call up the Edit mode, make the changes, and then return to Write.

In Write mode, one can't skip back and forth in the text that is already in the system, searching for the right place to put an overlooked bon mot. This is the distinction

between correcting and editing.

The Word Worker will perform reasonably well when you want it to correct a misspelling or insert a set of lines or delete a block of copy. The user can do a global search to change one word or a short phrase throughout a document. He or she can make only one fix on a line at a time, however, and can't delete a character in one word and add a character in another without retyping the line or making two

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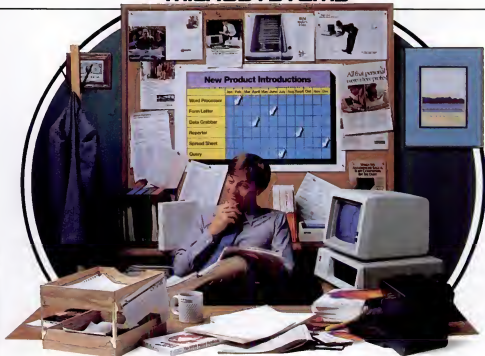
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How to move a paragraph.

passes at it. Text editing is difficult when one has to move back and forth between Write and Edit modes. Mistakes may occur because of sheer weariness.

Essential Features

The Word Worker can perform most word processing tasks. Text can be entered; the sentences have automatic word wrapping; margins can be set left and right and changed as needed; and text can be underlined.

By using a "fill" command, one can generate a string of dots (called "leaders" in typesetting), which is used especially for tables of contents. The "fill" command, combined with The Word Worker's ability to center words or phrases automatically, print them flush left, flush right, or a combination of all three on one line (something that some of the full-featured programs cannot offer), are among the program's strong points.

The program's means of centering text or moving it between margins is the simplest I've seen. To move text flush right, one presses R and the Tab key (C and Tab will center copy). If the user types a number followed immediately by the Tab key, the cursor jumps that many spaces.

So what is missing from The Word Worker? Text cannot be right-justified; the program does not, as delivered, support any of the PC's ten function keys; and the user cannot move through text with quick strokes of the cursor keys.

Editing

Ah, here's the rub. Follow me through a simple editing change. I have finished writing this review, stored my copy, and decided that the first sentence of this paragraph should be phrased more like the original; it should say, "Ah, there's the rub."

I type **RUN** **EDIT** to load and start the editing module. The program asks whether I want to store files on Disk A or B; from which disk I want to retrieve files; and whether I would like to chain several functions together (such as retrieve, display, edit, and store).

Now I'm ready to read the program's directory of files, where I face a number of housekeeping questions. When I finally get to the editing menu I type #2, **"Correct Line."** The copy appears on the screen in blocks of 20 lines at a time. If I know the

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line number at which I want to make a correction, I can type the number in at the bottom in response to a prompt. If not, pressing return will take me through the file one page at a time.

Now that I have found the error and told the program the line to be corrected,

**THE USER
cannot move through
text with quick
strokes of the
cursor keys.**

the following appears on the screen:

! = Ah, here's the rub. Let's !

TYPE IN PHRASE JUST BEFORE CHANGE.

I type in ah. The program says:

TYPE IN ANY ADDITIONS AND (ENTER).

I type in t. The program says:

ENTER < TO DELETE FIRST OF LINE:

! = Ah, !

ENTER > TO DELETE LAST OF LINE:

! here's the rub. Let's !

TYPE IN ANY DELETIONS

!

I have nothing to delete, so I press [Return].

After a few grinds of the disk drive head, the following appears:

LINE #40

THE CHANGED LINE WILL READ:

(!-INDICATES CHANGES)

Ah, !there's the rub. Let's

COMPLETE THESE CHANGES (Y OR N)?

I type in Y and the program inserts a "t."

The other editing commands, including line or block insertions, work in a similar fashion. The Correct Line function is ten to 30 steps more complicated than other programs, which require moving the cursor up a few lines, pressing the Ins key, and typing in the corrections.

Printing

The Word Worker holds its own and scores a few points on some of the opposition with its Print mode. The program allows users to select ten printing format parameters, including selecting the number of spaces between lines, the number of

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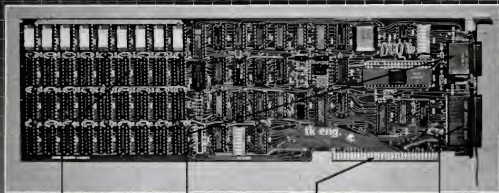
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lines per page, the size of the top margin, the number of spaces to indent from the left margin, the number of lines to skip between the end of a chapter and a new chapter heading, and pagination controls.

The program can print a main title on page 1 and include that title in a running header or footer on each subsequent page. It can also extract new chapter titles from nonprinting remark lines and print them where specified. A special control asks the program to print the main title on even-numbered pages and the chapter title on odd-numbered pages.

Ten choices are offered for positioning the page title and/or page number: top or bottom left, center, right, inside or outside. Page numbers can be suppressed or printed in one of three formats.

The printing mode also calls up and inserts footnotes, which are stored as separate files by The Word Worker.

Finally, the BASICWP program also has a handy subroutine that takes the inside address from a business letter and prints it on an envelope at your command.

The printing routine operates under the BASIC Lprint command, and should drive any printer that will accept the IBM's output codes. (This article was produced on a Smith-Corona TP-1 with a parallel interface.)

As delivered, the program allows the user to underline text on the printer. The book offers instructions on how to add enhancements such as boldface, subscripts, and superscripts.

File Management

The program permits little margin for user error. It is possible to lose text, to delete lines inadvertently, and to designate any number of files by the same name.

The program's directory, separate from the one produced by a Files command under BASIC or a Dir command under DOS, provides scant information. There is no way for the user to determine file size, date of entry, or version number unless he or she codes them into the file name, which is restricted to eight letters.

Also, if the user deletes a file from BASIC with a kill command, it remains in The Word Worker's disk directory. My commands to delete it kept bringing me an error message from BASIC.

Efficiency and Learning

This set of programs is like an elephant

in a ballet troupe: It is neither elegant nor subtle. But despite the fact that relatively simple tasks require numerous steps, the program is not difficult to learn if one has the book as a guide.

Outstanding Features

If there's something the The Word Worker user wants to change, or if he or she would like to customize the messages on the screen, a little tinkering under the hood is all that is necessary. That is easier for some people than for others, but one doesn't have to be a programming genius. McCunn's book furnishes a number of suggested modifications. One of the first I'd recommend to IBM PC users would be the assignment of editing and printing tasks to the ten function keys.

Aesthetics

The Word Worker does not display a nice, neat menu of choices or offer a margin indicator on the screen. As befits its

bargain-basement price, what one sees on the screen is bare bones.

At the top of the screen is a reminder that the PC's special control character is Ctrl-Q. Line numbers are displayed down the left side of the page, which is essential for later editing. Paragraph indents are visible with leading spaces and the use of a special character in column one. No indication is provided on the screen for the column number in which the cursor is waiting. There is no end-of-page indicator either. All in all, what appears on the screen is what gets printed.

If you're looking for perfect or easy writing or a program that will elevate you to a select group of word processing stars, you probably will not be very happy with The Word Worker. But if you're looking for an inexpensive word processor and don't mind putting up with extra key-strokes and the limitations of line editing, this program will suit you fine. The Word Worker will do most word processing tasks and do them well. /PC

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A PowerText Performance

The program does the job, but the ax needs sharpening before it can become powerful.

PowerText
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While reviewing PowerText, I was reminded of my grandfather, who liked to call himself an "Ax" carpenter. If he sawed off a board and it didn't quite fit his purpose, he'd get out the ax and beat on it until it did. Ax carpentry isn't much for ornamentation, but it gets the job done.

Selecting a word processing program is similar: Choosing the tool that gets the job done is very important. PowerText is what I'd term an ax word processor; it doesn't provide ornamentation, but it's an adequate tool. The buyer, however, should check carefully that this tool will, as my grandfather used to say, "do the deed."

Requirements

PowerText uses the UCSD p-System, supplied on the system disk. The program accommodates both single- and double-sided drives; however, a minimum of two single-sided drives or one double-sided drive is required because the program fills one side. A single-sided drive stores up to 200K, and double-sided drives can be formatted to record 400K of text. Disks must be specially formatted using the PowerText program with the option of having disks hold eight or ten sectors of information per track. Selecting ten sectors per track is more practical because 25 percent more storage space becomes available.

The system disk, which contains the program code, is supplied on a single-sided disk. If you have double-sided drives, you'll want to copy the program onto a double-sided disk, which allows you to store documents on the system disk.



PowerText will run on a 64K system, leaving enough memory for short documents only. With 64K, the actual number of bytes available for documents is 13,308—roughly three pages of text having 50 lines of 80 characters each. The use of PowerText for longer documents will be limited unless you break up text into a number of small files. PowerText is best suited to systems with more than 64K of memory.

Although set to run an Epson printer, PowerText supplies print routines that make the PC compatible with Qume, Diablo, NEC 3550 and 3530, C. Itoh 510, and Integrated Data Systems 460. It supplies one general routine for all other makes, and Beaman Porter, Inc. also customizes PowerText for any compatible printer.

Editing

Central to PowerText's method of word processing is the use of stored formats for documents. Letters, for example, routinely include dates, salutations, addresses, and closings. How and where this information should appear in the printed document is recorded in a file on disk. More informa-

tion is included in the format files: line spacing, paragraph indentation, margins, pitch, and the number of lines per page. Once created, the format file is used whenever you create a new document.

Although the idea of stored formats is not new, PowerText allows you to use them to perform text editing in a unique way. At the beginning of each new document, specify the format file to be used. Next, type the different elements of the document, prefacing each with a key word defined in the format file. For example, to enter the salutation of a letter, type the key words /sa and John. When you print the letter, the salutation will be printed out as "Dear John," correctly placed and punctuated at the top of the letter. You can type the date, address, and salutation in any order without considering line spacing, and the computer will sort it all out. The same goes for the body copy: Type /par at the beginning of each new paragraph without indenting, skipping lines between paragraphs, or using carriage returns, and the program will set up properly indented and aligned paragraphs in the order that you typed them.

As you may have guessed, PowerText is not a screen-oriented word processor. Letters have piles of information at the top of the screen followed by the body of the text strung out in lines of various lengths. As long as you correctly use the key words designated in the format files, the letter will print out correctly despite the apparent disorganization on the screen.

One consequence of this editing method is that you are not sure how the finished document will look. PowerText solves this problem by allowing you to display fully formatted text with an option of the print utility. (Note, however, that you cannot edit text at this point in the program.) If the sight of unformatted text is too bothersome, the command "Noedit" makes PowerText function as a screen-oriented word processor.

PowerText is a full-fledged editor with the normal options of inserting and deleting text, making global searches and replacements, copying and moving parts of a document, and paging or scrolling through text. You can also set the direction of operation to delete forward or backward through the document while you are editing. Because formatting is done from a format file, setting tabs or adjusting margins while editing is unnecessary, although margins can be changed by typing special commands. Most of the advantages of PowerText over other word processors come from these special commands.

In general, I was satisfied with PowerText's editing capabilities, though a non-screen-oriented program required some adjustment. You can type a line right off the end of the screen and out of sight. This is more likely to happen when you first use PowerText because the word wrap feature must be turned on manually at the beginning of a document. The prompts on the screen are somewhat difficult to read, adding a certain awkwardness to the process of text editing. No help menus or messages are available, so the operator must rustle through the pages of the manual for answers to questions. I'd rate PowerText's editing as average to good.

File Management

PowerText is fully equipped for file management. You can format two disks at a time, duplicate disks, copy files, rename disks or individual files, and check the disks for bad sectors. You can attempt to

recover files in a damaged sector, but recovery is not always possible.

An option called "Krunch" rearranges files to save disk space. Parts of the disk can also be reserved for later use. Two levels of disk directories can be called up, depending on the amount of information desired.

PowerText's style program, which helps the user create format files, is an outstanding feature. Simple prompts appear on the screen, asking the user questions about how the document should appear. This program is very easy to use, and you can create a new file in just a few minutes. These files are the heart of PowerText's method of editing, and I commend the designers for simplifying a procedure that could be difficult.

Printing

PowerText can be configured to use a number of different printers. The print utility offers the options of printing a document on a continuous form or individual sheets of paper. It can also display the doc-

ument as it will appear on paper. Another option on the print menu saves the fully formatted document on disk for later reference or editing. Finally, the file may be sent to a different printer or a data communications channel.

PowerText has a special feature that enables hexadecimal code commands to pass directly from the document to the printer. For example, at a certain point in a document you can embed a hexadecimal command to make the printer underline or change pitch. With sufficient technical knowledge, you can make a printer do almost anything, but beginners will probably not take advantage of soup up a printer in this manner.

The only way to terminate printing is to reset the computer. This kind of procedure carries the hint of ax word processing.

A Variety of Features

PowerText has a variety of editing and printing features. It performs standard word processing functions, such as underlining, boldfacing, super- and subscript-

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ing, automatic page numbering, search and replace, and headers and footers. PowerText also has functions that number footnotes automatically, triple-strike letters for extra boldfacing, and one called "Title Paragraph," which centers subheads over text.

A command called "Contents" automatically generates a table of contents for documents and one called "Box" encloses

might type /1, /2, or /3 before each element of the outline to differentiate three levels, but you don't have to type any labels or numerals. The outline command increments each label automatically whether it is a roman numeral, digit, or letter. If you have to change the outline, the outline command automatically relabels each element. This feature is handy for anyone who creates formally prepared research papers and reports.

Other interesting features are page breaks, which automatically eliminate single lines, or widows, dangling on a page. These features qualify PowerText as a full-featured word processing program.

Efficiency

In terms of efficiency, PowerText has a few flaws. The amount of time required to switch between the utilities listed on the main menu is one weakness. Watch in hand, I timed 31 seconds to exit from the editor and load the print utility. Quitting the file utility and loading the editor can

take 13 to 18 seconds, depending on file size. The only way to leave the style program that designs document formats is to reset the computer—a process that takes 40 seconds. These times represent considerable delays in operation.

A point that counterbalances the delays is the type-ahead capability of PowerText. After a while, most people know their word processing program well enough to make selections in a procedure without seeing a menu. After a short acquaintance with PowerText, I could type the selections necessary to exit the editor and go to the print utility all at once, and then sit back and let the computer run itself. I got a pleasant sense of working at my own speed rather than the computer's (which is slower in this case).

Once you get used to the fact that what you see (on the screen) isn't what you get (on paper), editing is fairly easy with PowerText. You are initially burdened with learning the syntax of the formatting commands for paragraph indentation and

POWERTEXT'S style program, which helps the user create format files, is an outstanding feature.

specified text in a box. If you've ever tried to draw a box around text using other word processors, you'll appreciate the ease with which this function gets the job done.

PowerText's column and outline commands are two features that especially impressed me. When typing columns, you normally type entries across the page horizontally. Such an effort usually requires a lot of tabbing and concentration. With PowerText, however, you can type an entire column at one time, then type the next column(s) in the same way, one after another, without any tabbing at all. If you've specified two columns (you can use up to 14), you type /1 and all the entries that go in the first column. Then you type /2 and the entries for the second column. Do the same using /3, /4, etc. for any succeeding columns, and PowerText will search through all the entries and line them up on paper. This procedure for typing columns is the simplest I've ever encountered.

Typing outlines is another task that PowerText simplifies. To type an outline one would normally organize major headings and subheadings in sequential order down the page, indenting and adding roman numerals or letters according to the levels of importance. With PowerText, after specifying the levels and numbering scheme of the outline, the outline function indents and labels each element. You type each element in the order it is to appear and specify its level of importance. You

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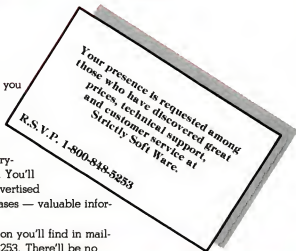
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typing columns, but once you master the commands, you can be sure the text will appear on paper as you want it. If you make an error, however, you'll most likely discover it when displaying text using the print utility. Remember, it is in the print utility only that you can see how the text will look on paper. Unfortunately, typos and command errors cannot be corrected

BEGINNERS beware.

at that time. You must cancel the utility and reenter the editor (a process I timed at 20 seconds). If you don't spot all your mistakes the first time, you may end up making a number of trips from the print utility to the editor.

One major oversight is that the function keys are ignored: PowerText makes no use of them at all. Certainly many of the important key words and commands could be programmed to use these keys, saving the effort of typing them out, speeding up text processing, and decreasing the possibility of errors. Those ten function keys would go a long way toward making the editor easier to use.

A major advantage attributed to PowerText by its makers is that it frees the user from having to worry about how text will look on paper. PowerText's documentation claims that once you've determined format files, you can word process as you would dictate a letter. I question, however, whether the formatting capability of PowerText really saves time. PowerText eliminates the need to decide where to place information on paper, but it diminishes this savings with the need to remember and type four to six character commands for each element of the document. For example, beginning a new paragraph with PowerText requires four keystrokes (typing `/par`). Other word processors may require three to five keystrokes, including extra line spaces and indentation. In this case, there is little, if any, reduction in the number of decisions or keystrokes.

Without question, its method of typing columns is an advantage over other programs, and PowerText imposes consistency in the appearance of what is typed. On

the whole, I don't see PowerText's formatting ability as an advantage over screen-oriented word processors.

Using and Learning

The PowerText people have done first-time users a favor by including a tutorial in the documentation. This tutorial introduces the important concepts and procedures of its method of text editing. The reader has a sound understanding of the program at the end of the ten lessons. The unsuspecting reader is told that "some errors are fatal" and "careful study of the reference material and experimentation will uncover a wide variety of features." For me experimentation uncovered a wide variety of ways to make errors. The documentation would benefit from some good editing, but the content of the lessons allowed me to use the program fairly quickly, something a first-time user would be eager to do.

In spite of the tutorial, PowerText is not really a program for beginners. Unless the

user is firmly grounded in the basic concepts of text editing and file management, he or she could easily become confused. One of the first things one would need to know to edit a document with PowerText is to set parameters for the display of text on the screen. One of these parameters turns on the word-wrap feature, which is otherwise set to "off." Yet the key used to set the screen display appears nowhere on the editing menu; you must remember how and when to give the command. This kind of omission occurs more than once.

Beginners may also have trouble with the computer terminology used on screen and in the documentation. When bringing up the directory of a disk, the computer asks, "Dir listing of what vol?" That can be a perplexing question if you don't know that "vol" stands for "volume," which means "disk." The program is asking you to type the name of the disk, but the request is probably not apparent to the uneasy newcomer.

PowerText's method of moving text is

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quite scary. To move part of a letter, you must first delete it. If I were a beginner, I'd feel very uneasy about deleting text I wanted to keep. The deleted text disappears into a buffer (a kind of holding pen) where it can be recalled into the text using the copy function. This method of moving text works, but you may make an error or erase a buffer before you mean to.

Characteristics/Impediments

PowerText has some real pluses and minuses. On the plus side, it offers a wide variety of outstanding editing features. The program's abilities to generate outlines, create tables of contents, and produce columns of text are exceptional. The tutorial provided with the documentation is good, but the quality of the documentation is fair. The style program, which creates the formal files for documents, is easy to use and is very well designed. PowerText's file management capability is comprehensive and attempts recovery of information from bad disks.

On the minus side, PowerText isn't the easiest program to learn or use. Beginners beware. I crashed PowerText several times while learning it. When you are changing between the utilities and editor on the main menu, there are significant operational pauses. Many word processing programs are using more and more on-screen documentation, but PowerText is going in the opposite direction by making its menus and options appear as codes.

Recommended Applications

PowerText is a workman's tool. In spite of its substantial number of word processing features, it lacks the polish and ease of use of screen-oriented word processors. It seems an unlikely candidate for adoption by secretaries or corporate word processing pools. The user who has gained mastery of its many features will no doubt find it a versatile tool, but for those who have little experience with data processing jargon, text disappears into "buffers," quick deletions are called "zaps," and menus appear slightly hieroglyphic. An irritating period of getting acquainted lies ahead.

PowerText is a program for the individual with programming or word processing experience. Pioneers in cottage industries, solo entrepreneurs, students, and researchers might put PowerText to good use. The program works well for individuals who slug out correspondence in the

quickest way possible and don't care how it looks on the screen. But PowerText possesses a complexity and awkwardness in use that is unacceptable to word processing professionals with large numbers of documents to produce.

POWERTEXT
*is a program for the
individual who has
programming or word
processing experience.*

Aesthetics

I've characterized PowerText as a workman's tool; aesthetically it's just that—rough and utilitarian. Prompts that appear on the screen are often short and cryptic. For example, the prompt line that appears during copying is:

>Copy: B(uffer F(rom file <esc>

This is not easy to understand. (It means you have three options: copying from the buffer, copying from a file on disk, or pressing the escape key to stop the copy process.) These kinds of prompts (and they all look this way) really give the sense that the programmer was trying to conserve the amount of memory taken up by program code. It's the user who loses in terms of comprehension.

The documentation carries the same sense of usefulness without ornamentation. Pages are crowded with information, and there are no illustrations, except for the same typed representation of the main menu, which appears repeatedly without change or emphasis. It's a rough job—not the slick, terse clarity other IBM PC documentation offers. There is room for improvement in Beaman Porter's presentation of PowerText to the user.

Beginners and experienced hands alike will want to examine PowerText carefully before deciding whether it is the word processor for them. /PC

Bill Groat writes computer documentation and has published articles in Microcomputing, Desktop Computing, 80 Micro, and 80 US Journal. He has recently published a book with Alemony Press.

The Benchmark Word Processor

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The Benchmark
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I purchased my IBM Personal Computer about 3 months ago and immediately started scouring computer magazines to compare prices and features of compatible word processors. As an electrical engineer, my forte is digital design, and like most EEs in the field, I love to use computers. I had worked on a Scientific Data Systems (SDS) computer at work and had used its



WIDOW AND orphan control keeps single lines at the beginning or end of a paragraph from being separated from the rest of the paragraph.

word processor frequently.

When I sat down to search for one that would fit my needs and budget, I set up some guidelines for comparing word processors. I wanted one that is easy to use and learn, has the most useful features for the money, allows me to print form letters, and works with other software such as a mail merge program. I immediately ruled out EasyWriter because a friend had had nothing but trouble with his, and I ruled out WordStar because I had played with

one at ComputerLand that was difficult to use and took too many keystrokes to start a function. I was looking for good, but when I tried out The Benchmark by MetaSoft, I found great.

Program Requirements

The Benchmark requires CP/M-86, 128K of RAM, and one disk drive. Two disk drives and about 256K of RAM improve the performance, but I found that the minimum requirements were adequate. A second drive allows you to append, copy, merge, and transfer part or all of one document on one disk drive to another document on a different drive. Additional RAM enables The Benchmark to reduce the number of disk accesses while you are working on a document, thus increasing your speed. CP/M-86 takes up

56K of RAM, and the word processor takes up 34K more; this leaves 38K for the document's RAM work space where the file is located while being edited.

The Benchmark allows you to choose from about 20 printer drivers to interface your printer to the word processor. The list below includes most of the popular dot matrix and daisy wheel printers on the market:

General (CR/LF) Printer	Diablo 1610/20 & Qume (Prop.)
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Centronics 737	NEC 8023 Driver
IBM Selectric or Backspace	NEC 3500 Series (Prop.)
Tandy Daisy Wheel Printer	C. Itoh Daisy Wheel Printer
Epson MX Series	

Applications

Writers, small businesses, and secretaries could benefit from the IBM PC/The Benchmark combination. Easy standard commands allow the user to write, edit, print, append, merge multiple documents, use variable fields in forms entered from the keyboard at print time, and insert standard paragraphs into a new document. Other capabilities include column and



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21

Easy-to-install ConvertaBuffer comes with built-in cables which plug directly into your PC's printer adapter and your printer's serial interface without removing the cover of the system unit.

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nath functions, headers and footers, foot-
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and legal documents, centering, flush
margins, and widow and orphan control.
The Benchmark provides almost all the
conceivable tools for creating and printing
paperwork. Even large companies could
benefit from The Benchmark. The power
to control multiuser access to file network-
ing (computers sharing files and talking to-

ANOTHER outstanding feature is the indexed document.

gether] is made possible. For some big
businesses this is a necessity.

MolMerge, another program from
MetaSoft, works with The Benchmark to
produce labels and form letters merged
with data files and/or keyboard-entered
data. It offers a number of functions that
could increase the productivity of many
businesses. Following are some of these
commands considered in more detail.

Editing

When you first enter the word proces-
sor, the following choices are presented:
Create, Revise, View, Print, Merge, or go
to an additional procedures menu. Create
and Revise are used most often. If you se-
lect the Create mode, the program asks for
a file name (30 characters), operator's ini-
tials, and author's initials. A volume num-
ber and revision letter are automatically
attached to the file. You are sent into Insert
mode as soon as you finish entering this,
and the document can be started.

Since the word processor has automatic
word wrap, you don't have to hit a carriage
return at the end of each line unless you
are at the end of a paragraph or want to
end a line purposely. The screen scrolls
both vertically and horizontally as you
type; you can set the number of lines to
scroll horizontally.

When you finish inserting, one key-
stroke takes you back to what The Bench-
mark calls Control mode. The word pro-
cessor is always in either Control mode or

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Action mode. In Control mode the word processor is waiting for a command or is prompting you for parameters to set up the screen or the printout. The word processor is in Action mode after a command has been entered and the function performed. For instance, if the document you are working on is displayed on the screen and the word processor is waiting for you to enter a command, then you are in the Control mode. To delete text, move the cursor to the first character to be deleted and press D. Now you are in the Deletion mode, one of many Action modes, and the word processor is waiting for you to define the text to be deleted. The current mode is always displayed in the top right portion of the screen along with the name of the document, special parameters set, character count, line count, and current page. Although this may sound confusing now, it's very easy to pick up, especially since almost all the commands for adding and editing text are executed with only one keystroke.

The Benchmark provides all the editing commands to insert, delete, overtype, move, copy, and exchange text. Inserting text can be done in the Insert mode or the Overtyping mode, in which you write over the existing text. Deleting, copying, moving, and exchanging text all work similarly. Position the cursor to the first character you want to edit, and then enter the appropriate command (D for delete, C for copy, etc.). Next define the block of text to be edited by pressing the right arrow for one character at a time, the space bar or tab for one word, the carriage return for one line, or any character that defines the text up to that character. The affected text is highlighted in reverse video so that you can be sure you are working on the intended text. This way you can edit anything from a single character to a whole document. Once you have finished defining the text, press the F10 key to execute the command.

The Search and Replace commands are more powerful than they are in most word processors. After you press S to search, The Benchmark asks you to enter the text to be located. The search can be done by either upper- or lowercase or both. When you are looking for whole words, The Benchmark searches for a space on both sides of the word. For example, when searching for list, it will not find listen. Another option is to search without display, which is twice as fast as searching



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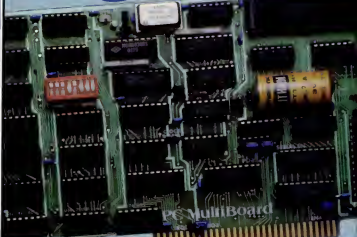
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with display. You can even put "anything-in-this-space" characters in your text. For example, you can search for any four-letter word that starts with s and ends with n by entering `g?n`. The Benchmark would stop on such words as spin, span, and soon. You can redefine the anything-in-this-space character if you need to look for a single "?". The Replace command is essentially an automatic Search command. If, for example, you typed in "Basic" in-

able as long as your printer supports the options. Everything from simple underlining to supporting different sheet feeders is provided. The standard print options are chosen from a menu displayed on the screen. The print format can be changed many times and in any place in a document. Special print formats used repeatedly can be defined to a library with only two keystrokes, so as to set up a format containing numerous parameters.

Figure 1: The Benchmark directory during a print command

File	Title	Size	Auth	Oper	Created	Revised	Time
>< 01A	Letter to Jones	8K	JME	nrg	30-NOV-81	30-NOV-81	20:11
>< 02A	Smith Proposal	9K	JME	nrb	04-MAR-82	15-APR-82	11:40
>< 03C	Jacob Will (Draft)	9K	GDH	mmh	12-MAR-82		13:56
>< 05F	BENCHMARK Review	15K	GDH	gdh	15-SEP-82	26-SEP-82	23:01
>< 05E	BENCHMARK Review	13K	GDH	gdh	15-SEP-82	24-SEP-82	05:15
END OF DIRECTORY							
ENTER "P" in Column 1 to Select All Documents to be Printed							
F10 to continue. F1-Display 01. F2-Scroll. or ESC to return							

stead of "BASIC," you could enter the change before initiating the search. With this replace command, the program automatically makes the change and continues without stopping at the word.

The Tab commands allow you to center columns of words and text, set up standard indentations, and set up flush-right tabs. This is helpful for producing outlines and legal documents. Other commands include those for moving and erasing columns of text or numbers, and adding, subtracting, multiplying, and dividing numbers in columns.

If your document needs headers, footers, or footnotes, The Benchmark has the commands. It also provides widow and orphan control. (Before I was involved with word processors, I thought people were talking about an adoption agency. Actually, widow and orphan control keeps single lines at the beginning or end of a paragraph from being separated from the rest of the paragraph.) Centering text is another command that can be executed with only one keystroke. The Benchmark has many useful commands for controlling how your printout looks, in addition to the vast array of editing commands.

Printing Features

A multitude of printing options is avail-

able in the print format you can define text to be underlined, bold, overstrike, shadow, normal, or a combination of these styles. The proportional printing, left and right margins, first and last printed line, line spacing, number of characters or lines per inch, and the sheet feeder selection can be set easily. The Benchmark also prints subscripts and superscripts. Another feature for people with printers that have removable print wheels is the Automatic Print Stop command. When this command is used during printout, the printer stops to allow the user to change the print wheel. Press C to continue the printout when the new wheel is installed.

You can print your document a single line at a time, a group of lines at a time, a page at a time, or the entire file. Printing multiple files, a standard feature, can come in handy if you have to split up a document into more than one file because it is too long to edit or store in a single file.

File Management

MetaSoft obviously put extensive thought into file management within the word processor. Once you boot your computer with CP/M-86 and start the word processor, all file management is done in the program. The first time a new disk is used to store documents, a Storage Unit, or

SUN, has to be set up. The SUN is actually one large CP/M-86 file in which you store many documents. With a floppy disk system, each drive is set up to hold one SUN. Several SUNs can be put on a hard disk drive. To name your documents, the word processor gives you 30 characters—better than the eight that CP/M-86 allows. It also assigns a volume number and revision letter. The operator's and author's initials are required, and they are useful for keeping track of documents when several people are using the same system. If you are revising a document, the old name is shown on the screen as the default for the new document. The name can be changed or retained, in which case the revision letter automatically goes up one.

The Additional Features option in the main menu gives you many of the available file management commands. This menu allows you to copy files from one SUN to another, delete any files, and read CP/M-86 files into a SUN, or vice versa. All these commands allow you to work on multiple files. You can delete any or all of the documents on a SUN at once. The Benchmark prints the command and the document's title at the bottom of the screen. You can also set the time and date from this menu.

When you are revising, viewing, or merging documents and you don't remember the volume number and revision letter of the document, just press [F10] and the entire directory for the selected SUN will

**WITH ONE-
and two-keystroke
commands, The
Benchmark is quick
and easy to use.**

be displayed. The name, volume number, revision letter, size, author, operator, date created, and date and time of last revision are displayed for each document. This information is more helpful than that supplied by CP/M-86. The same directory is displayed for copying, deleting, or printing. To copy multiple files, put a C in the first column of each document you want to

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copy. Figure 1 is an example of a directory shown during a print command.

The word processor is designed to do word processing, but MetaSoft says you can work on BASIC or assembly files too. You have to turn off the automatic word wrap, however, and set the left margin to column 1 to work on these files. When you get done editing or creating this kind of file, you have to copy it to a CP/M-86 file

THE
"dangerous"
commands always ask
you to confirm that
you know what you
are doing.

to use it. All in all, the file management system is excellent. Everything is menu driven, and the commands flow smoothly.

Efficiency

The combination of several of The Benchmark's features results in a quick and efficient word processor. Almost 75 percent of the commands are executed with only one keystroke; the remaining 25 percent can be executed with two. The Benchmark uses what MetaSoft calls "panels" to prompt the user for setup parameters for the page layout, printout style, and tab lines. After you strike one of the function keys, the document you were working on disappears from the screen and is replaced by a format with the respective parameters for the selected panel. Default values are already entered for all the parameters, so you have to change only the parameters you want to alter.

Once you have entered your changes and pressed [F10], the word processor brings the document back to the screen exactly as it was when you entered the panel. Only on the line where you entered the panel is there an indication that you have altered one of the three panels; A "#-Page Format" line will appear for a page layout change, a caret will appear before the text when the print style is altered, and "...T...T...T (etc.)" will appear when you enter a new tab line. You may think that

that sounds great, but that entering a new panel must require more than two key strokes. It does the first time you enter it but after the initial panel information entry you can save the entire panel's parameters to a single key (a-z, A-Z) by using the Library command. You define the #-Page Format and assign the format to a key the same way that you defined text to move or delete when editing. For example, after you have set up the print panel for underlining, define the caret symbol and assign it to the letter u, and assign the normal print to the letter n. The next time you need to underline while inserting, press [Esc] and u, and the text will be underlined until you press [Esc]n, which sets the print back to normal. You can even assign many formats and lines of text to a single key, but the total text defined for one key must be less than 2,000 characters.

Another feature that increases The Benchmark's speed is the way it can jump through the text to find something. The jump command lets you go to any page in the document without scrolling through each page in between. Being able to set the number of lines to scroll horizontally makes the scroll adjustable to your particular style. The blind search also speeds things up. Again, the different commands and menus flow smoothly and logically.

Outstanding Features

The Benchmark will not come up short on capabilities; few features are left out. From simple inserting and deleting to creating form letters and legal documents, the tools are available to handle small- and large-business needs.

One criterion for a good word processor is the ability to handle form letters. The Benchmark provides this capability in several ways. One method is what MetaSoft calls the "rapid form fill-in," which uses the Quick command. You create your form with "[variable name]" in the locations where you want to fill in information to personalize your forms and letters. When you want to use your form, use the View option from the main menu and press Q for quick variable fill-in. You have to turn on the interactive print option, which prints a screen of text as you scroll through it. Each time the word processor finds a "[variable name]" it will stop and automatically enter the Insert mode for you to fill in the variable name. As you proceed through the document, the

changes to the variable will be printed along with your form.

The second way is by using the Merge option from the main menu. This option is similar to the rapid form fill-in method, but differs in that you can enter only variable information in the Merge mode and you can edit the form and the variables in the rapid form fill-in option. You again create a "pattern" document, or form, with "[variable name]" where you want to enter information. When pressing M for Merge from the main menu, you will be asked whether you want to merge information from the keyboard or from an information file. You need MetaSoft's Mail-Merge program for the latter, so if you don't have it, you need to enter from the keyboard. The next prompt asks if you want to print the merged document, save it on disk, or both. Then the word processor will travel through the pattern document and stop to ask you for the variable information as it finds it.

Another outstanding feature is the indexed document, a group of paragraphs or sets of paragraphs that each have a 10-character "tag" identifying that collection of text. These tags can be inserted individually into another document or can collectively create an indexed document. To use the indexing feature, for example, you create a pattern document with "[tag name]" where you want the selected paragraph to be. A lawyer could create an entire will by entering the following: [will top][declarat.][wife's dec][property][dispositn.]. Each indexed paragraph would be assembled in the order entered. Once you have your pattern document ready with the indexed tags where you want them, you Attach (A) the indexed document and do Quick search (Q) and the document will be assembled.

The Library feature is my favorite. Being able to assign formats and groups of commands to a single key is very useful.

Using and Learning

Even though I am not a rookie (having used another word processor before), I am not an expert either. It is a tribute to the simplicity of the program that I was writing, editing, and printing letters and forms in only 2 days. The only problem I had was with the manual. The section on setting up SUNs to store files and CP/M-86 features appears to be added as an afterthought.

I like the way the manual is divided

into two sections: the "Get-You-Up-And-Running" section with the basics and the "Advanced Features" section. Some chapters could have used more examples, however, and the manual needs an error appendix to explain the different errors, some possible reasons for them, and what to do about them. The command dictionary needs some reference for where to look in the manual for more detailed explanations.

With one- and two-keystroke commands, however, The Benchmark is quick and easy to use. There is a built-in help feature in case you forget a command and what it does. Press ? from the Command mode, and a list of instructions appears on the screen until you find what you need and press [Esc] to return.

Shortcomings

The disadvantages of this word processor are in its requirements. Many people don't have CP/M-86 and 128K of RAM. You can get both easily enough with money, but it would be nice to run the system on 64K and on PC-DOS. MetaSoft is working on a version that would run on DOS, but the 128K RAM minimum would have to remain. I have had only one real operational problem so far. One of my storage units was messed up and even though I could enter the document's name and enter the Revise mode, the second I tried to

THE SYSTEM *has style and manners, and possesses the tools to do the job.*

do anything with the document, the system would give me a "Write-Error" on that file and then go west. I had to reboot the system to get out of that situation. After this had happened to me several times, I re-created my storage unit, copied my files back into it, and everything was fine. I still don't know what caused this problem, but it indicates that an error section would be helpful.

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I was generally very pleased with The



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Benchmark. I found it to be a great word processor. The menus and screen formatting create a user-friendly system. The "dangerous" commands always ask you to confirm that you know what you are doing. If I had to choose a word to describe The Benchmark, I would choose "professional." The system has style and manners, and possesses the tools to do the job. MetaSoft's word processor may indeed be the benchmark against which all other IBM

word processors will be compared for some time to come. /PC

George D. Hughes, Jr. is an electrical engineer who works with computers at Poly Scientific, a division of Litton Industries, Inc. in Blacksburg, Virginia. He recently started his own company, Hughes Integrated Systems, Inc., and is working on his MBA at Virginia Tech.

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Using the Write-On word processor is like wearing a jacket from a thrift store: It may not be the best of its kind, but it may suit your needs and eventually become a real favorite.

Judging Write-On's line-oriented editor objectively is difficult after several years of being spoiled by the "what you see is what you get" approach of other programs. However, Write-On has features such as mail merge and temporary margin that are usually found on much more expensive programs.

Requirements

Write-On is written in Disk BASIC, so one disk drive is required. The manual describes a simple procedure for creating a master disk that contains the BASIC.COM, Write-On, editor, and printer programs. The program requires only 48K of RAM, although 64K is recommended. Write-On can be used with any kind of printer.

At start-up the simple menu-driven installation procedure asks whether the printer requires any special control char-

acters and whether a separate line feed character is required at the end of each line. If the user's printer provides a backspace function, the program will accommodate underlining and boldface.

Editing

Write-On's editor concentrates on a single line of text at a time. An asterisk in the left margin marks the current line on which changes, deletions, inserts, block markings, and moves are made. The current line is also the place where other files may be merged into the open file. To carry out these actions, the asterisk is moved to the desired line, and the action is described on a command line at the top of the screen. The asterisk can be moved a single line, a specified number of lines, or a screen at a time, or it can be moved to the top or bottom of the text.

This process is very flexible, but there are a few catches. There are no line numbers and, since the screen is emptied and redrawn at every command, keeping track of the desired line is somewhat difficult.

As with any word processor, a good part of Write-On's power is in its ability to manipulate blocks of text, and the program does move, copy, delete, or repeat blocks well. The problem is that it doesn't display the boundaries of the marked block. (Fingerprints on the screen won't be from the kids; they'll be from their parents counting

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lines.) No method is provided for determining where a printed page is going to end until the file is printed. No widow or orphan protection exists for avoiding very short lines left hanging at the top or bottom of a page.

Write-On includes an acceptable Global Find and Replace feature, complete with a "Repeat Find" or "Repeat Change" to allow altering of some occurrences of a text string but not others. Since this feature is not particularly line dependent, it operates like any other Search and Replace feature. The program does not search backward, though, so it should always be started from the top of the text.

Some drawbacks of text input in the line edit mode can be avoided. An edited file can be created from the keyboard (a new file) or from an existing disk file. When a new file is created, the user may categorize it as a text file, a data file, or another type of file (such as a BASIC program). One way to avoid some of the drawbacks of text input in the line edit mode is to select the third option. This causes the program to jump into the Insert mode and activates the cursor control keys and program editing keys on the PC's keyboard. Write-On acts as a screen editor in this mode, but the automatic wraparound feature is disabled. This Screen Edit mode was intended to facilitate editing of BASIC, Pascal, or assembly language programs, but it may prove useful for text entry as well.

A file can be screen edited as a text file if the user types Ctrl-E as soon as the blank insert screen appears. A carriage return brings the cursor from the command area to the text entry area and activates the program edit keys. The user need only remember to press the Ins key to start the text entry and to press it again after pressing Del.

Printing

Several files can be printed in sequence at one time. Thus, a long file can be broken up into smaller files for editing and merged for printing. Multiple copies of the same file can also be requested by repeatedly specifying the file name. To save the time it takes the program to format each line as it prints multiple copies, the user can save a formatted file as a print image file on the disk after editing. Printing can be paused with the Break key,

which interrupts the BASIC program, and can be resumed by pressing F5.

Printer commands embedded in the edited text can control page length, margins, tabs, justification, paragraph indentation, line spacing, headings, and pagination. The default values for these format parameters are reasonable except for the margins: left (one character), right (79 characters), top (one line), and bottom (66 lines). People rarely want text that close to the edge of the paper. Consequently, those margins must be redefined at the top of every file.

The program's page numbering system is flexible enough to allow the user control of the form and location of the page number. An alternating page feature is included for printing even numbers on the left and odd numbers on the right. An interesting feature is the capacity for 20 centered reading lines. That's considerably more than many other programs, although the usefulness of more than one or two headings is not immediately apparent.

Other embedded print commands force the program to produce new paragraphs, new lines, or new pages and allow a line to be indented, centered, or right-set right justified, left ragged).

File Management

Write-On's file management facilities are minimal. The user has a chance to view the directory of any of four disks when the program asks for a file name. The naming conventions are restricted to using an extension of ".T" for text files, ".D" for data files, and ".P" for print image files. This convention may be inconvenient for people who use the three-letter file type to keep their documents classified for example, letter files that end in .LTR, or memo files ending in .MEM).

No automatic backup copies are created when a file is saved, and the user must exit the program to DOS to copy, rename, or delete files. The ability to create, edit, and merge data files into text is one of Write-On's strongest features. It can be used to print form letters, mailing labels, checks, or almost any kind of form that doesn't require calculations. Write-On can use its own data files or those created by another program.

A conversion program is provided for data files from other programs. Data files are composed of records that can be up to

nine fields long, each field holding up to 256 characters. The data files can be edited in a manner similar to Write-On's text file editing. Up to 100 data files can be specified for a form letter at one time.

Once the data file is created and edited, commands are inserted in the text file to access the variables. When the program encounters a symbol {\Fn\}, it searches

T **THE PROGRAM runs accurately the first time out.**

the data file for the next entry in the nth field. One copy of the text file is printed for each record in the data file.

Another strong feature is that variables can be typed in from the keyboard as the file is being printed. If a signal and the text of a prompt are embedded in the text at the appropriate places, the program will stop printing, flash the prompt on the screen, and insert the input from the keyboard into the proper place in the printed file.

Write-On has two unique formatting features. One is the temporary margin, which makes it easy to create outlines and enumerated lists, and the other is the ability to maintain three alternate margins within a single file. This feature is especially useful for scriptwriting: stage directions, character names, and dialog each use different margins, and the writer must constantly switch among them.

Learning and Using

Once a user gets past the confusion of the screen's being redrawn with no line numbers, the program is relatively simple to learn. A person new to word processing probably has some advantage over someone more experienced because the documentation is organized as a tutorial.

Although the tutorial documentation is not particularly well written or organized, it seems to be technically accurate. The manual, however, is visually annoying after awhile. Each page of four or five blocked, justified paragraphs of text looks exactly like every other page. There are no graphics other than a few examples of printed output. Topics are presented in one-page segments, but without subhead-

ings or other visual clues. The single-page length is fortunate—the user won't have to reread more than a page or so to find the necessary instructions.

The documentation writers seem to have run out of tutorial steam when they reached the section on using data files; it needs more succinct instructions.

The program comes with some good sample files. Once the user figures out how to edit them, they can serve as useful models. They cover all the temporary margin, tabbing, and data file features.

Aesthetics

Write-On is quite a clunker. It does what it promises, but it never promises elegance. Line editing is never slick. The menus are simple but inconsistent. Some expect a numeric response while others require the initials of the menu choice. The user is required to do more work, particularly in text editing, than is desirable. One misses the feeling of support and consideration for the user found in other word processing programs.

On the other hand, Write-On has been around for a while (it was originally written for the Apple II), and most of the real bugs have already been found. The program runs accurately the first time out.

Applications

Write-On is a relatively low-cost option for people who use a word processor primarily for form letters. Such people could endure the inconveniences of line editing, gritting their teeth through the text entry phase for a single letter if they could sit back while the program printed out copies for 100 data files.

Scriptwriters would probably appreciate the multiple margin feature, but they would have to evaluate what effect line editing would have on their creativity.

It is difficult to imagine how a user with a large, diverse typing load could learn to love this program. Such a user might find a more expensive product the better buy, as it would make life easier. A program that costs two to four times as much as Write-On may not be so expensive if it saves time and work over several years. */PC*

Horry Miller is a technical writer and editor who lives in Donville, California. He specializes in microcomputer applications.

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Nine times out of ten, when people talk about word processing software, someone mentions MicroPro's WordStar. Not only is it the most widely known word processing program, it is also considered by many to be the best. Program writers dream of achieving such recognition and envy WordStar's lofty reputation.

Program Requirements

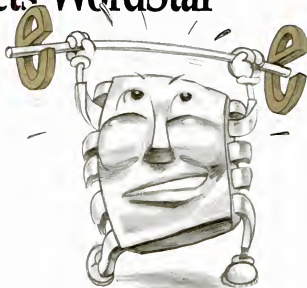
Marketed at first for only the CP/M operating system, WordStar now provides versions for the Apple II and the IBM PC. WordStar's PC version became available just about the same time IBM was updating its operating system, PC-DOS 1.10. As PCs were rushing to implement DOS 1.10, MicroPro and many other manufacturers got caught with sophisticated programs that were compatible with only DOS 1.0. As a result, many PC users had a confusing time getting their WordStar packages up and running, especially since the first WordStar IBM documentation section made no reference to either DOS version and left much to be desired in its installation instructions.

MicroPro, however, has now updated WordStar to be compatible with both PC-DOS 1.0 and 1.10. PC-DOS 1.0 was compatible with only WordStar 3.02. When purchasing WordStar, be sure the new program and any options such as MailMerge and SpellStar are at least version 3.2. IBM PCs need a minimum of 64K RAM, but several functions of the program will run faster and require less available disk space if you install more memory. The manuals do not indicate how

much more is needed for comfortable operation, but 128K will probably accommodate the longest document that you want to maintain as a single file.

WordStar requires two disk drives for most applications, but more may be advisable for word processing chores such as file merging or for copying files from separate subject disks to one common disk. Drive A must always hold the WordStar program disk, which contains all WordStar editing and printing programs plus MailMerge, SpellStar, and PC-DOS utilities. It's advisable to transfer any word processing commands that you may need (COPY, DIR, ERASE, COMP, TYPE, RENAME, and CHKDSK) from DOS to the WordStar program diskette.

Drive B holds standard storage disks for straight text entry, editing, and printing. Thanks to DOS 1.10, WordStar works well with double-sided drives. It doesn't take long to discover that the 320K capacity of a double-sided storage disk offers a distinct advantage in using WordStar. It allows whole documents or a series of related documents to be stored on one disk. Beyond these special options, WordStar requires only an 80-column display and a printer.



Variety of Features

Text entry, editing, and printing benefit from what may be the largest number of commands available on a microcomputer word processing program. The WordStar quick-reference card lists 132 separate commands addressable from the keyboard. Most of these require two or three key sequences (for example, [Ctrl]-KS or [Ctrl]-Q for cursor control and text manipulation). For printing, 40 "dot" commands, which can be embedded within the text, are required. Users may add program supplements that increase WordStar's flexibility. One of these is MailMerge, which is essentially an enhanced printing routine. It allows boiler-plate files (recurring slogans, addresses, or whole paragraphs) to be appended to or inserted in one or more documents. It also provides for automatic realignment of margins where variable length material is inserted. The other program supplement is SpellStar, an option that acts as a spelling checker and document word counter. Both options are produced by using one-key commands from WordStar's opening menu.

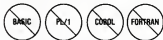
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Using and Learning

In many word processing programs the cost of multiple features is an unwieldy number of commands. This can become especially cumbersome if the commands require multiple keystrokes. To assist the newcomer, WordStar subdivides commands into logical groups, each with its own detailed menu. The No-File Menu appears first, along with a directory of disk files on Drive A. The No-File Menu lists one-key commands, used mostly for utility functions such as opening a file; changing the logged drive; setting help levels; and renaming, copying, or deleting files. Once you open a file, you can begin to use the editor.

In editing mode, the Main Menu lists commands for cursor movement, scrolling, deletion, and other miscellaneous operations. There is also a directory to five other menus: Help, Block, Quick, Print, and Onscreen. To call up these menus, you press [Ctrl] and the corresponding letter. The Help menu, [Ctrl]-H, lists ten brief explanations that assist in setting margins, moving text, and other procedures. The other menus feature 17 to 20 commands each in the following functions:

- **BLOCK** ([Ctrl]-K): saving text, executing block moves, and carrying out other file operations used in editing.
- **PRINT** ([Ctrl]-P): specifying special printer effects and commands.
- **ONSCREEN** ([Ctrl]-O): setting margins and tabs; centering lines; and turning justification, page break, word wrap, etc., on and off.
- **QUICK** ([Ctrl]-Q): positioning the cur-

Epson Printing from WordStar

A program to enhance your WordStar printouts.

WordStar version 3.02 can be expanded to support all of the IBM PC (Epson MX-80) printer's style features. These features—compressed, emphasized, double-width, or double-strike print—can be installed in the user-defined patch area of WordStar. The program, as distributed by MicroPro, leaves four control codes available for such purposes. Figure 2 is a quick reference summary of the print enhancements.

The procedure described in Figure 3 changes some values in the assembly language patch area of WordStar. While you don't really have to know anything about hexadecimal notation or assembly language programming, you will have to be careful to make the changes exactly as you see them below. Steps 6 and 11 are inserted as safety precautions. Check the contents of these program locations carefully against the predicted results. Be sure to use a PC-DOS diskette and a diskette with a copy of the WordStar program (WS.COM) on it. Do not use the distribu-

tion diskette with the MicroPro logo on it.

If the results on the screen match those in step 11, the enhancements should work properly as soon as you test them. There are, however, a few characteristics of the program and the printer that must be honored if these features are to perform as expected. The control codes to turn the double-strike and emphasized features off must not be on the same line as the start code. The printer will look for the "off" code and ignore the start signal. In addition, the codes made up of three characters ([Ctrl]-PEE, Ctrl-PEF, Ctrl-PEG, Ctrl-PEH, Ctrl-PE8, Ctrl-PE9) must be typed as follows: hold the Ctrl key down and press P; release both keys; hold the shift key down and press the next two characters (EE, EG, EF, EG, EH, E8, or E9). The letters in the codes should be uppercase. If they appear in uppercase on the screen, you'll know they are correct. Figure 4 shows an example of the enhanced print features.

—Ralph Sampson

sor and deleting, finding, and replacing text within a file.

Where possible, mnemonics are employed. For example, [Ctrl]-O turns on the right margin justification in the Onscreen Menu.

WordStar presents four choices for help screen and menu suppression, numbered 3 through 0. The more suppressed (or the lower the number), the more room

there is on the screen for text. Even if you have full help (the default value each time you start WordStar), the program works ahead of screen changes so that you can execute a command on one of the supplementary menus without waiting for the menu to appear. In fact, supplementary menus won't appear at all if you know your commands well and enter them quickly. This speeds your return to text editing. There are still many commands, however, not explained on the screen. Read the documentation thoroughly and keep the reference card nearby.

Fortunately, WordStar for the PC makes use of the cursor control and function keys not found on most CP/M microcomputers. Cursor direction, scrolling, insertion/deletion, and tab commands listed in Table 1 operate naturally and are easy to learn. WordStar uses function keys F1-F10 to take the place of ten other commands as shown in Table 2.

The choice of commands is odd in some cases. As any WordStar user soon discovers, a few common commands would be more efficient as function keys than as Set Margins or Cursor Positions (F3, F4), and Mark Block Beginning/End (F7, F8). An experienced user would have

Table 1: Standard Keyboard Function Keys*

IBM Key Number	Key Label	WordStar Function	Equivalent WordStar Command(s)
4	←	Move cursor left	[Ctrl] S
8	→	Move cursor right	[Ctrl] D
6	↑	Move cursor up	[Ctrl] E
2	↓	Move cursor down	[Ctrl] X
7	Home	Move cursor to top left of screen	[Ctrl] QE, QS
9	Pg Up	Display previous screen [scroll down]	[Ctrl] R
3	Pg Dn	Display next screen [scroll up]	[Ctrl] C
1	End	Move cursor to bottom of screen	[Ctrl] QX
0	Ins	Insert	[Ctrl] V
	Del	Delete	[Del]

* Press the number lock key, [Num Lock], to activate. This key switches the functions on and off.

no need during editing for Set Help Level (F1). Some suggestions for function keys are: Save Text/Resume Edit (Ctrl-KS), move cursor to last position before Save (Ctrl-QP), Reform Text (Ctrl-B), and Save Text/Done (Ctrl-KD). Unfortunately, the Help Menus explain none of the function keys or cursor controls. Cursor movements are listed by their Ctrl-Character commands only.

MicroPro does not provide adequately revised documentation or tutorial material with WordStar version 3.2 for the IBM PC. Apparently, MicroPro wished to avoid the expense of editing the manual to reflect the PC's simplified keyboard command structure. Its compromise is a two-part introduction in which the first section provides space for the user to write in changes pertinent to the IBM PC.

The second section, entitled "Printer Installation," provides more valuable information than mere printer configurations. It gives step-by-step instructions for making a WordStar program disk from DOS and the master disk, as well as directions for formatting the disk. This is well written except for a curious description of the procedure for turning on the PC. The instructions tell you to switch on the PC and "immediately insert the IBM diskette labeled 'IBM DOS' into disk drive A." A note advises that if you wait too long, a beep will sound and you'll have to start over.

Follow IBM's directions instead. Place the disk in the drive, then power up. The introduction does not mention the AUTOEXEC.BAT facility on the PC operating system. The WordStar documentation instructs you to wait for the DOS A> prompt and enter WS (Return). If AUTOEXEC.BAT is used, all date, time, and start-up procedures for WordStar could be held in its file and executed automatically when the system is booted. The IBM part of the documentation does not mention (and the main section of the manual mentions only briefly) the need for DOS-formatted storage disks. Since data cannot be saved unless the storage disks are DOS-formatted, this omission is a great oversight.

When it comes to getting to know WordStar's operation, both novices and experienced users will find help in the separate Training Guide supplied with the program. This tutorial is a top-bound spiral workbook with a built-in cardboard as-

sel. It introduces operating basics. Professionals buying WordStar for their own use may object to the secretarial tone of the Training Guide. It assumes that the pupil doesn't know a disk drive from a cursor and, unfortunately for the PCer who has the cursor pad, it wastes time on Ctrl-Character cursor movement. However, the guide can teach you enough in a couple of hours to help produce a letter or short report. Without it you would have to spend

several days studying the rather dry, detailed manual to extract the essential instructions.

Editing

Text entry is straightforward. From the No-File Menu you specify whether you wish to open a document or nondocument file. The first gives you the power of WordStar page formatting and other options such as word wrap and justification. The

Put a Little Color in Your WordStar

WordStar users can replace "half" and "bright" screen intensities with colors such as blue, yellow, cyan, brown, and magenta.

WordStar can be both colorful and efficient with the right equipment and modification of the program machine code. If your color monitor isn't delivering much color or if it won't accept intensity signals (resulting in display of only eight of 16 possible colors), the problem and solution could be in the WordStar patch areas.

With the release of WordStar 3.2M (the one that is compatible with PC-DOS 1.10), MicroPro has provided two user patch areas. [A user patch area is a portion of the machine code that can be modified by the user to customize his or her copy of the program.] Appendix C of the WordStar manual contains macro assembler code for patch area "User 1" and "User 4." User 1 is devoted to the areas that affect the display, while User 4 deals with the printer interface.

After close inspection of the well-documented patch areas, it became apparent that the user could change the display-attribute bytes that were sent to brighten and dim characters on the screen. As in BASIC, display attributes control whether characters are written in reverse video, underlined, blinking, and—for the color graphics adapter—which colors are used. [In BASIC, the Color statement controls the attribute byte sent to the screen and is used before the Print statement.]

In the standard version of WordStar, as received from your dealer, display attributes are set to brighten menu titles and edited text, and dim marked blocks and

menu information. If you are using a monochrome display or a color monitor that accepts an intensity signal, you will observe these variations in intensity. I do not, the entire screen will appear in one shade without these helpful attributes.

When using an RGB color monitor with eight colors and no intensity variation, you may get around this limitation by changing either (or both) the bright or dim display attribute bytes to display color instead of intensity. Here's the procedure:

1. Place a DOS diskette containing DEBUG.COM in drive A:. If the computer is not yet on, turn it on; otherwise reset the system with the Ctrl-Alt-Del keys.
2. Place a copy of WordStar with the WS.COM program on it in drive B: (make sure that you're using a backup copy).
3. At the DOS command prompt A> type `DEBUG B:\WS.COM` [Enter].
4. Select a color/intensity value from the Display Attribute Chart (Figure 1) that you want to assign to the areas that are normally dim during the WordStar program [text]. If you wish to change color but maintain the low intensity, select a value from the left column. To leave the dim areas unchanged (white), skip to step 7.
5. The prompt for DEBUG is a dash. If no error messages are displayed and the DEBUG prompt is present, type `E 0284` [Enter]. The screen will look like this [xxxx = any four digits]:

```
-E 0284
xxxx:0284 07...
```

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THIS WORD PROCESSING CHART presents the features of 20 word processing programs. Most of the programs are available for the IBM PC, although several are scheduled for release (these programs are marked with an asterisk).

The information presented here has been supplied by software publishers. We regret that we were unable to test every program.

PC Magazine Guide To Word Processing Programs

Software Manufacturers

Product	Manufacturer's Address	Phone
Benchmark 3.0	Metasoft Corporation 711 E. Cottonwood Ln., Ste. E Casa Grande, AZ 85222	(602) 836-0268
Easytext	Novell Data Systems Corp. 3400 Wilshire Blvd. P.O. Box 70127 Los Angeles, CA 90010	(213) 257-2026
FinalWord	Mark of the Unicorn P.O. Box 423 Arlington, MA 02174	(617) 489-1387
Forthwrite	Miller Microcomputer Services 61 Lake Shore Rd. Natick, MA 01760	(617) 653-6136
Master Word	Micro Masters Software Ltd. P.O. Box 513 Edmonton, Alberta T5J 2K1 Canada	(403) 922-3088
Perfect Writer	Perfect Software 1400 Shattuck Ave. Berkeley, CA 94709	(415) 644-3644
PowerText	Beamman Porter, Inc. Pleasant Ridge Rd. Harrison, NY 10528	(914) 967-3504
Select	Select Information Systems 919 Sir Francis Drake Blvd. Kentfield, CA 94904	(415) 459-4003
SuperWriter	Sorcim 405 Aklo Ave. Santa Clara, CA 95050	(408) 727-7634

Product	Manufacturer's Address	Phone
VersaText	TexasSoft 1028 N. Madison Ave. Dallas, TX 75208	(214) 941- (214) 495
Volkswriter	Lifetree Software, Inc. 177 Webster St. #342 Monterey, CA 93940	(408) 659-
Wordflex	Nemco 9 Walnut St. Rutherford, NJ 07070	(201) 933-
Wordnet86	Monoson MicroSystems, Inc. 51 Main St. Watertown, MA 02172	(617) 924-
Word Perfect	Satellite Software International 288 West Center Orem, UT 84057	(801) 224-
WordPlus	Professional Software, Inc. 51 Fremont St. Needham, MA 02194	(617) 444-
WordStar	MicroPro International 33 San Pablo Ave. San Rafael, CA 94903	(415) 499-
Wordvision	Bruce & James Program Publishers 6924 Riverside Dr. Columbus, OH 43017	(614) 889-
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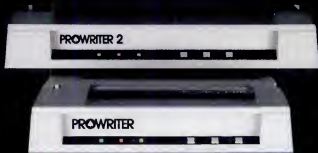
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4. Close the page and slip-sheet

3. Slice the folded edge

2. Arrow pointing to the fold

1. Front side touching the free page

2. Insert this sheet with

1. Open the foldout page

Inverted Foldout slip-sheet



GbsSlipSheet-001

Folded edge of the page

Foldout slip-sheet

1. Open the foldout page

2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

3. Slice the folded edge

4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Obs5tpBack-001B

Back

1. Follow instructions on the other side

	DOCUMENTATION			TEXT CONTROL			PAGE CONTROL			CURSOR CONTROL			INSERT	DELETE			SEARCH									
	Reference Manual	Tutorial	Quick-Reference Card	Right Justify	Center Line	Move Blocks	Column Layout	Move Columns	Headers and Footers (At Least One Line)	Headers and Footers (Two or More Lines)	Automatic Page Numbering	By Character	By Word	By Page	To Beginning & End of Document	Horizontal Scroll	Typewriter Insert Character	Insert Lines	Character Word	Line Sentence	Find Word/Phrase	Find and Replace n Times	Find and Replace All Occurrences in Text	Ignore Case Upper/Lower	Find and Replace Backwards in Document	Automatic Backup When File Saved
BENCHMARK 3.0	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TEXT	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WORD	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WRITE	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
ER WORD*	●	●		●	●	●	3	3	●	●	●	●	●	●	3	3	●	●	3	●	3	●	●	●	●	●
CT WRITER*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
RTEXT	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
T*	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WRITER*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TEXT	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WRITER	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
FLEX*	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	3	●	●
NET 86*	●	●	●	●	●	3	3	●	●	●	●	●	●	●	●	●	●	3	●	●	●	●	●	●	●	●
PERFECT*	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
PLUS	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
STAR	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
VISION*	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	2	●
WORKER	1			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
E-ON	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Book is available.

programs are currently being
ed to run on the IBM PC.

(2) Not applicable

(3) Information not available

REMEMBER!



MORE THAN JUST ANOTHER PRETTY FACE

Says who? Says ANSI.

Specifically, subcommittee X388 of the American National Standards Institute (ANSI) says so. The fact is all Elephant™ floppies meet or exceed the specs required to meet or exceed all their standards.

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They're a group of people representing a large, well-balanced cross section of disciplines—from academia, government agencies, and the computer industry. People from places like IBM, Hewlett-Packard, 3M, Lawrence Livermore Labs, The U.S. Department of Defense, Honeywell and The Association of Computer Programmers and Analysts. In short, it's a bunch of high-caliber nitpickers whose mission, it seems, is in order to make better disks for consumers, is also to

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nondocument file gives you compatibility with other programs. It works as a line-oriented editor to enter text for later retransmission through a non-WordStar format such as the DOS TYPE command and telecommunications.

In either case, the program prompts you to specify the file name. If the file name you specify is not in the directory, the screen tells you it's a new file, then delivers the editor and Main Menu. The

editor assumes a number of default settings: word wrap, ruler line (at the top of the text area denoting margin and tab placements), right justification, page breaks, single spacing, 0 and 65 margins, and Insert On, to name several. If you don't want your material right-justified, you must turn off the justification, [Ctrl]-O, every time you power up WordStar.

WordStar provides one of the fastest, most pleasing editors available in a micro-

computer word processing program. Inserting text is as fast and easy as entering regular text, except that you press the Ins key once to enter Insert Mode. A status line at the top of the screen plainly says INSERT ON when you're in this mode. Pressing [Ins] again turns off the function. Word-to-word cursor commands ([Ctrl]-F forward and [Ctrl]-A backward) and the PC keyboard cursor/scrolling controls make it easy to move around the screen.

Block movements are very professional. When you set beginning and ending markers anywhere in the text—phrase, sentence, paragraph, column—the block is highlighted in low-contrast characters. Text is in high contrast. Then you can copy, write to another (new) file, move within

(continued from page 128)

If an error message is displayed, type Q [Enter] to return to the DOS command prompt. Check your work; repeat step 3.

6. Now type in the 2-digit value you selected from the Attribute Chart. Press [Enter].

7. Choose a value from the Attribute Chart to replace the high-intensity attribute in WordStar (marked blocks and menus). If you wish to change color but retain the same intensity, select a value from the right column of the attribute chart. If you don't want to change from high-intensity white, proceed to step 10.

8. At the DEBUG prompt "a" type E 028B [Enter]. The screen should look like this:

```
-E 028B
XXXX.028B 0F -
```

9. Enter the 2-digit value you have selected and press [Enter].

10. It would be a good idea to check your work now, before making the changes permanent. To do this, type D 0280 [Enter]. A large block of numbers will be displayed. The fifth set of digits from the left on the first line should contain the value that you entered in step 5 (or the original value 07 if no change was made). The twelfth value from the left on the first line should contain the value that you entered in step 9 (or a 0F if no change was made). If either of these values is incorrect, redo the appropriate step and check your work.

11. Write the changes to disk by typing W [Enter]. The program will respond with "Writing 5000 bytes."

12. Exit DEBUG by typing Q [Enter].

Now you're ready to use the modified version of WordStar. Remove DOS from drive A: and replace it with the modified WordStar disk from drive B. Type WS

[Enter] and you should be seeing new colors and/or shades in WordStar.

Some people prefer WordStar to appear differently even on the monochrome display. Instead of having normal text bright and marked blocks dim, you may utilize the procedure just mentioned to swap the values in the first and second addresses. This causes normal text to be bright and marked blocks to be dim. One possible drawback to this configuration would be that the menu titles and menu text also change to opposite brightness attributes.

Other effects may be obtained, such as inverse video and blinking. Consult the IBM Technical Reference Manual, page 2-50, for more specific information about the attribute bytes.

The WordStar manual (Appendix C, User 1, pages 5 and 6) contains detailed information about use of display attributes and their location in the WordStar program. You'll notice that the remarks in this section make use of the word "highlighting," which is somewhat misleading. "Highlighting" in their usage means "marking text." In the IBM version as supplied, "marked text" appears dim rather than bright.

—Bob Rice

Figure 1: Display Attribute Chart

Hex Value	Color	Hex Value	Color
01	Blue	09	Light Blue
02	Green	0A	Light Green
03	Cyan	0B	Light Cyan
04	Red	0C	Light Red
05	Magenta	0D	Light Magenta
06	Brown	0E	Yellow
07	White	0F	High-Intensity White

FREQUENT USE of WordStar keeps you conversant with its many commands.

the same file, or delete. With 64K of memory, however, these functions are limited to blocks smaller than 900 characters, or about 3/4 of an 8 1/2- by 11-inch, double-spaced page. This is one good reason to acquire more RAM.


WordStar makes maneuvering margins and tabs easier, either by specifying a direct location space number corresponding to the columns on the adjustable ruler line ([Ctrl]-OL [Return]) or by setting the cursor to the desired location on the screen and telling WordStar to set the margin there. Users who make charts will appreciate the decimal tab feature, which makes sure that columns of numbers (with or without decimal points) are properly aligned. Paragraphs can be quickly offset for emphasis by setting a temporary left-hand margin (F2). The line will word wrap and automatically indent the next lines until you press [Return], erasing the temporary margin.

After editing a document, [Ctrl]-B reforms (realigns) the text one paragraph at a time. A program default parameter called Hyphen-help will stop reformatting if the program comes across what it thinks is a multisyllabic word at the end of a line. The

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screen offers three choices: hyphenating the word at the position of the cursor (not always the correct spot in the word), moving the cursor to another spot for hyphenation, or choosing not to hyphenate. Turning Hyphen-help off helps reform faster and makes text easier to read. Reforming respects all spaces inserted during editing.

COMPUTER

software should not dictate changes in the way the user works.

including two spaces after a period. Indented paragraphs need the temporary margin (F2) set before reforming. To reform the entire document (and avoid indented paragraphs), you instruct the editor to continue reforming the whole text. The Quick command, [Ctrl]-QQ-[Ctrl]-B, does the trick, though the WordStar manual fails to provide this tip.

Text appears on the screen as it will appear on paper. When you specify double-spacing, [Ctrl]-OS2, lines are double-spaced on screen and "LINE SPACING 2" appears on the top status line. Multiple line spacing slows editing, however, because moving the cursor from text line to text line sends it back to the beginning of the next line on the left margin, whether the line is full or empty. Entering and editing text in single space for later reforming in double space doesn't save time because the requisite extra lines are not automatically inserted between paragraphs.

Page breaks are indicated by a line of dashes and a "P" at the right of the screen. You can suppress this feature with command [Ctrl]-OP. The status line at the top of the screen identifies the document page number, line, and column on which the cursor is located at all times. When page breaks are turned off, the status line shows character, line, and column number. To get a character count of your text, press F9 [Ctrl]-QR and read the status line figure. Press another [Ctrl]-OP and you're back in page format again.

Embedded, or "dot," commands in WordStar allow you to specify one-line headers and footers, forced or conditional

page breaks, top and bottom margins, special page numbering, special paper lengths, and several commands for daisy wheel-type printers. One command, OP, turns off the default setting that automatically prints the page number at the bottom center of each page, starting with Page 1.

If you plan to edit diverse document styles such as charts, letters, and memos, WordStar's inability to store formatting commands ([Ctrl]-O commands) with each document could cause lost time as you try to remember and reenter parameters for each document. Margins and tabs can be saved by creating a nonprinting ruler line. To do this, move the cursor to the left margin setting desired, turn insert on [Ctrl]-V, type two periods, press [Ctrl]-P, and then [Return]. What remains can at best be listed only in a nonprinting comment line (preceded by ..) for reentry at edit time.

The limitations of 64K memory capacity force the editor to dump blocks of text (usually around 1,000 characters) into temporary invisible files on the disk. A Save command reassembles and stores the pieces as text file. As the program makes

a file name. If it's the only file you've edited before printing, you can avoid typing the whole file name by pressing [Ctrl]-R for Restore Entry. Otherwise you need to type the file name and extension. Then press [Esc], and your entire file prints out in the default mode. Press [Return] and answer all the questions and prompts provided to reset any of the following parameters.

- Disk file output: to print out for a new file on disk rather than the printer.
- Start at page number: to start print midway within text.
- Stop after page number: for partial printing.
- Use form feeds: if your printer does not state them internally.
- Suppress page formatting: A "yes" suppresses page breaks, top/bottom margins, headers, footers, and page numbers.
- Pause for paper change between pages: an essential parameter for single-sheet feed; default is continuous form.

The WordStar documentation says in the beginning section that the IBM 80 cps printer and the NEC 3550 letter quality

Table 2: Function Keys

IBM Key	WordStar Function	Equivalent WordStar Command(s)
F1	Set help level	[Ctrl] JH
F2	Indent paragraph to tab	[Ctrl] OG
F3	Set left margin at cursor position	[Ctrl] OL ESC
F4	Set right margin at cursor position	[Ctrl] OR ESC
F5	Underline *	[Ctrl] PS
F6	Boldface *	[Ctrl] PB
F7	Mark beginning of block	[Ctrl] KB
F8	Mark end of block	[Ctrl] KK
F9	Move cursor to beginning of file	[Ctrl] QC
F10	Move cursor to end of file	[Ctrl] QR

* Put cursor at beginning and end of text you want underlined or boldfaced, and then hit appropriate function key.

these dumps, there is a large enough buffer to handle input at 90 wpm even though the status line urges the typist to WAIT. It's a pleasure to find a program that doesn't make the user wait during text entry to write to the disk.

Printing

Making WordStar print a file is simple. First, Save the file ([Ctrl]-KD), then press P on the No-File Menu. You're prompted for

equivalent won't do fancy printing. Underlining, boldface (actually, double-strike instead of shadow), and overprint are about all they do. Daisy wheel printers, however, are supported with super/subscripts, microjustification, character width, and line-height commands. (These were not tested for this review.)

Version 3.2 of WordStar comes with a BASIC printer installation program to choose from the following printers: IBM

Parallel Printer, NEC 5510/5520 Spin-Writer, QUME Sprint 5, C. Itoh StarWriter, Diablo 1610/1620/630, Diablo 1640/1650/630, serial backspacing teletypelike printer, other serial teletypelike printers. The NEC 3550 Spinwriter responds with only the IBM Parallel Printer.

File Management

Disk files and file management play an important role in WordStar. A knowledge of PC-DOS is very helpful for avoiding mistakes and optimizing disk utilization. There are a few limits and cautions to consider in naming files. If you specify the name of a new file with an improper character such as / or -, you are not told that you've made an error. When you try to save the text you've entered, a prompt informs you that the disk is too full (it is not), and you're dumped back to DOS with all your keyboard input lost. File names must also be unique because extensions are ignored when the program makes backup files. For example, if you have two files

Figure 2: Summary of Epson print enhancements

CONTROL CODE ON	FEATURE	CONTROL CODE OFF
*PQ	Compressed print	*PR
*PW	Double width print	*PR
*PEE	Emphasized print	*PEF
*PEG	Double strike	*PEH
*PE8	Ignore Paper Out (used for single sheet feed—operational with IBM DOS V1.05 and later versions)	*PE9

called COMPUTER.LTR (a letter) and COMPUTER.DOC (documentation accompanying the letter), the program will create only one backup file (extension .BAK), called COMPUTER, each time you edit them. And since there can't be two COMPUTER.BAK files, the most recently edited file overwrites the other.

Efficiency

The fast editing functions (in single-space text), combined with many useful word processing functions such as block

moves and full screen editing, make WordStar an efficient package. As you become acquainted with the program, your editing speed increases. The program's efficiency increases dramatically with more than 64K of RAM. With more RAM the document could be held entirely in memory without saving sections of it in files as the buffer space is filled. Paging down through a document would not require waiting for the program to retrieve the next section of text from the disk. Unchangeable defaults are a nuisance if they don't fit your usual writing style. Seeking a document on a full directory could be a chore for the novice. Files are alphabetized on the directory to help you find them easily, but the profusion of regular and .BAK files can be overwhelming.

Outstanding Features

The editor, the heart of any word processing program, is the star of WordStar. Text entry, corrections, insertions, and deletions are all quick. You can perform practically every feature of the program while in the editing mode, including most of the No-File Menu commands such as printing, copying, and deleting a file. If your PC has more than 64K, you can edit while printing (not tested for this review) although the editor slows down somewhat.

WordStar document files are partially encoded with an eighth data bit assigned for word-wrapped lines and justification. However, the eighth bit can be cleared in a telecommunications program (such as PC-Talk) for transmission through services such as The Source. Two directly communicating computers (via modem, for example) can send WordStar files to each other "as is" for further editing.

File sizes are limited only by the amount of free space on a formatted disk. You need enough space on the disk to ac-

Figure 3: Installation of special print features

STEP	ACTION
1	Insert the IBM DOS diskette in Drive A
2	Insert the diskette with WordStar in Drive B
3	Turn power on
4	Enter today's date
5	Enter DEBUG B:WS.COM
6	Enter D 0757 076A The results should be: 049F:0757 00-00 00 00 00 00 00 00 049F:0760 00 00 00 00 00 00 00-00 00 If the values at these locations are anything other than zeroes, do not proceed
7	Enter F 0757 L2 01 OF
8	Enter F 075C L2 01 OE
9	Enter F 0761 L2 01 1B
10	Enter F 0766 L3 02 12 14
11	Enter D 0757 076A The results should be: 049F:0757 01-0F 00 00 00 01 OE 00 00 049F:0760 00 01 1B 00 00 02 12-14 00 00
12	Enter W
13	Enter Q
14	Remove IBM DOS diskette from Drive A
15	Remove WordStar diskette from Drive B and insert it in Drive A.
16	Enter WS
17	Try out the new print features

Imagine this . . .

You are working on a big document on your IBM PC. It runs at incredible speed . . . you have not had to change a diskette in ages or listen to the drives grinding . . . You press a single key and the whole next phrase types itself. Are you dreaming? NO—You are one of those wide awake people who have a

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commodate the document, its backup copy, and any temporary files produced by WordStar while working on a 64K system. You'll never really "fill up" a disk, since you'll need blank editing space at least as long as your longest file. Unfortunately, you cannot change storage disks mid-stream to save an active text file on one

WORDSTAR

provides one of the fastest, most pleasing editors available in a microcomputer word processing program.

disk and its backup file (.BAK) on another. You must constantly monitor disk size. On WordStar this is possible only if you run the DOS CHKDSK routine. There is a provision on the Main Menu for running a program without exiting WordStar, thus maintaining your session's parameters or changed default settings. CHKDSK is one DOS file worth having on your WordStar program disk. Disks fill up fast when you're not looking, but 320K double-sided disks offer great comfort to the prolific writer.

Impediments

One of WordStar's major annoyances is that it does not tell you if any of the default settings can be changed. Why should you have to reset logged disk drive to Drive B every time you invoke WordStar? And what if you practically never right-justify or print a page number on the first page of a document? You should be able to set these and other defaults at installation instead of having to set them at each session and for each document. A further annoyance is that you can't append files without the MailMerge option. You can append to some degree by copying text blocks from one file to another, but a basic word processing program ought to allow for easier implementation of some boilerplate files.

Another shortcoming for some users is that headers and footers are restricted to

one line each; this doesn't meet with everyone's writing style. Computer software should not dictate changes in the way the user works.

WordStar reproduces the look of your pages while you're in the editor, but this feature is somewhat misleading. Headers and footers are displayed on the first page only. If you specify a top margin greater than the default setting of two lines, the status line counter simply subtracts the blank lines from the bottom of the page, instead of padding the display at the top of a page. What you see on the screen is not necessarily what is printed. Nor is there a provision for viewing the printed output on screen. Finally, the transition to the print mode could be a little faster if the program assumed that you were going to print the file you just edited. Why is there no prompt listing the file being worked on as a one-key option?

Aesthetics

Menu screens in the editor may be intimidating to the new user. They are not explicit directions so much as guides to jog the memory about what you read in the manuals. The menus would be more helpful and less foreboding if they showed the IBM PC keyboard controls.

Given all the information needed in a program of this magnitude, MicroPro did an adequate job of designating menu categories and using high- and low-contrast

video characters. Document text is in the easily readable high contrast, while much of the menu, except subheadings, is in the nondistracting, low contrast.

Applications

Frequent use of WordStar keeps you conversant with its many commands. Double-density disk drives and 128K of RAM on the PC make WordStar more useful in long documents than most other microcomputer word processing programs. But you'll still want the MailMerge option in case you need to break a file into two parts and print it as one. The program handles short documents very well. Trying to find a file quickly on a directory when many files are listed can be frustrating unless you carefully choose file names and extensions. Copywriters who need to fit text to space based on type size and character count will like WordStar's ability to format on screen, reset margins, and reform quickly to new specifications.

WordStar, which has been a very powerful and flexible word processing program for CP/M microcomputers and others, is a welcome addition to the IBM PC product line. Although some adaptations such as editing the manual to show IBM PC keyboard capabilities, are not complete, the total package has more features than generally needed. Since WordStar is fairly expensive, try to use it a few times before deciding to buy it. /PH

Figure 4. Examples of Epson special print features

this is standard print

This line is boldface print

This line is emphasized print

This line is compressed print

this line is double width print

This is double strike print

This is emphasized and double strike.

Double width and emphasized

Dbl width + emph + dbl strike

endly aliens? Forget it!

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Color Your Keyboard

A sneak preview of WordPlus-PC, a word processing program that uses RGB on all the PC's function keys.

WordPlus-PC
Professional Software Inc.
51 Fremont St.
Needham, MA 02194
List Price: \$395

WordPlus-PC is being marketed by Professional Software Inc., a company that has sold more than 15,000 WordPro word processing packages on Commodore computers. Customer and dealer support facilities are already in place for this new IBM PC word processor.

WordPlus-PC is easy to use. A user can type a letter without setting values or entering format commands. The letter will then print out with default standard margins. For more complex documents, WordPlus-PC operates by means of embedded format commands, using a command line on the first line of the document. All margin settings, page centering, and line spacings are set on this line. Paragraph margins can be changed as needed by placing a new setting at the beginning and end of the paragraph, giving flexibility in document style.

Message Window

The bottom three lines of the WordPlus-PC screen display are called the message window. It functions as an interactive message area that displays what the program is doing, prompts, and requests for user input. When a function is accessed, a "prompt for information" appears in the message window. The first letter of each choice blinks to let the user know that it is waiting for one of the blinking characters to be pressed. Whenever the program requests information, the prompt is displayed with a question mark. Once the user answers the question, the question mark disappears and the function is performed.

The prompts and flashing characters

tell the user at all times where he or she is in the program. The first character in a prompt is highlighted. If the prompt "Erase All Remainder" is displayed, the A and the R are blinking. To indicate a choice, the user would press the appropriate key (A for all or R for remainder). Prompts of this type, in conjunction with the Help function and the use of the PC's function keys, make the program almost self-explanatory.

Function Keys

The various features of WordPlus-PC are controlled by the PC's function keys.

NEW, COLOR-coded keycap labels are supplied for the Alt, Shift, and function keys.

These function keys, and the various word processing functions assigned to them, are accessed either directly or in tandem with the PC's Alt or Shift keys. A quick reference card is supplied with the package to explain how the various combination keystrokes work. New, color-coded keycap labels are supplied for the Alt, Shift, and function keys. All the single-keystroke functions are listed in blue on the function keys. To display a directory of text files, a user locates the function key with the word "Directory" and presses the key. When pressing the Alt key, which has a red label, the user performs any function listed in red on the function keys. Similar-



ly, if the user presses the Shift key, which has a green label, the functions listed in green are performed. Since the function keys are color-coded, the user does not have to memorize various codes and keystroke sequences.

Print Features

WordPlus-PC displays both boldfacing and underlining on the screen when entered and printed. To begin underlining the user presses the color-coded Underline Start function key; all subsequent words are automatically underlined directly on the screen until the Underline End function key is pressed. Boldfacing is accessed in the same manner. To see the text as it will print out, the user presses the color-coded Video function key. The text is then displayed on the screen according to the format commands that have been entered. Video mode offers full horizontal scrolling for viewing spreadsheets and other wide documents.

Cut and Paste

The Block Move function is performed with the Cut and Paste key. The user defines the upper left-hand and bottom right-hand corner of the text to be transferred and moves the cursor to the block's destination. The program then asks whether to move "all lines or every other line." To manipulate columns when margin width is greater than 80, the user chooses the "every other line" option. Once the user presses A for all or E for every other line, the marked text is cut out and repositioned as indicated.

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Data Merge

With the Data Merge function the program reads records from an external data base, mailing list, or utility package and assigns the information contained in the record's fields into alphabetic variable names such as name or address. The user can then use these predefined names anywhere in text. For that particular letter, the variables read from the external record are assigned to the alphabetic variables in the text, and the letter or document is printed. With this type of data merge the user gets information directly from a data base or mailing list file without having to create a temporary work file. With the simultaneous I/O features of the program, the user can merge information from a mailing list and print out personalized let-

ters containing variable information while simultaneously adding or creating a completely different document. If access to the disk is required to store or recall documents during simultaneous I/O, the data merging would temporarily pause while the user got the document from disk and then automatically continue.

Marketing Information

Professional Software is offering a 30-day money-back guarantee on the program. A user may purchase the program, try it for 30 days, and, if not fully satisfied, return it for a full refund. If the user already owns a word processing program for the IBM PC and likes WordPlus-PC better, he or she can sell his old program to Professional Software for up to \$175. /PC

SOFTWARE

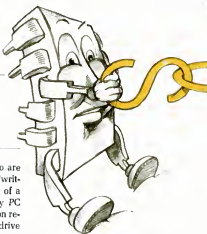
Personal Writing With Wordvision

Exploiting the market for under \$50.

Wordvision
Bruce & James
4500 Tuller Rd.
Dublin, OH 43017
(614) 766-0110
List Price: \$49.95

A forthcoming choice for those who are interested in word processing is the "writing tool" program, the first offering of a new publishing company started by PC founding editor Jim Edlin. Wordvision requires an IBM PC with 64K, one disk drive (two are recommended), a monochrome or 80-column color monitor, and PC-DOS. Its first public demonstration is scheduled for the COMDEX trade show this December, and it should be on the market by January.

According to Edlin, Wordvision has been designed to exploit the capabilities of the IBM Personal Computer and to serve



as a tool for personal writing. Edlin says earlier word processing programs were shaped by the constraints of less powerful computers and by the demands of secretarial and computer programming work, which he says have different needs from those of personal writing.



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Wordvision will have the basic facilities expected of a program for word processing: control of content and control of appearance. In the area of content, Wordvision will allow deleting, copying, moving, and finding and replacing text. The program requires no separate insert facility because additions to text are automatically inserted wherever the cursor is moved. Wordvision's cursor always points between characters in the displayed text rather than indicating a particular character (emphasizing the automatic nature of text insertion).

Other aids to content control are a phrase feature that allows reappearing phrases to be typed into text with two keystrokes and a special character feature that makes it possible to type nonstandard characters such as line-drawing graphics produced by a user's printer. A swap key allows correction of transposed letters with a single keystroke and another function key causes uppercase letters to become lowercase and vice versa.

Clean Copy

In control of appearance, Wordvision provides for user-settable tab stops that may be changed as needed. If a tab stop is moved, all text tabbed to that stop is adjusted accordingly. The program is also capable of multiple levels of indentation. Wordvision permits text to have either or both of two kinds of emphasis, which are initially set to underlining and bold printing, but which may be changed to any other emphasis, such as italic printing, for

which the user's printer is capable.

There is complete control of page formatting, including top, bottom, left, and right margins; number of lines per page; characters per line; and single- or double-spacing. Paragraphs can be printed with a

A PHRASE
feature allows
reappearing phrases
to be typed into text
with two keystrokes.

ragged right margin, a justified right margin, or in centered and flush-right formats.

Wordvision's page formatting is done with a graphic representation of the printed page on the screen, visually indicating the margin that is being adjusted. The formatting feature also includes automatic calculation so that text width, for example, could be specified as either 7 1/4 inches or 75 characters, with the program figuring out the conversion. Automatic page headings, footings, and numbering are also provided.

Embellishing the Keys

Wordvision makes extensive use of the function keys on the PC keyboard, and the package includes a set of colored labels to

be affixed to the keys to show their Wordvision functions. Most of the keys given named labels have a generic nature, such as "Disk" and "Print," that will also be applicable in other programs the company plans to publish. Edlin hopes these functions will be adopted as standard usage by other programs as well.

Functions more specific to the writing-tool program are accessed through the inner vertical row of the left-hand function key group, identified both by colors and symbols. Definitions for these "softkeys" appear across the bottom of the screen in a fashion similar to that used by IBM BASIC, but the colors, symbols, and position arrangement are intended to make their use easier.

Other keys that are given new meanings by Wordvision are the two at the upper right of the keyboard, labeled "word/line" and "sentence/paragraph." The function of these keys is changed to follow whichever other function key was last used; if "Delete Character" was the last function key pressed, then pressing the "sentence" key would delete the entire sentence in which the cursor was located. An "undelete" key is also provided for use when more text is deleted than desired.

Wordvision works with text in the PC's memory only. A document's maximum size depends on how much memory a particular computer has installed, but Wordvision can use the entire amount of memory installed. The base version of Wordvision will print columns with a maximum width of 75 characters, which is

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sufficient to fill standard 8 1/2-inch paper with 1/2-inch margins on either side. Users who want to print wider columns will have to add a "powerpack" program that allows wider columns and lets text be scrolled across the screen horizontally as well as vertically. Wordvision is designed to be "growable" through the use of such powerpacks, which Bruce & James, Edlin's company, plans to offer in the future, providing features for needs not met by the

main program.

The growable design is one element behind the firm's aggressively low price. Edlin says that Wordvision's \$49.95 price will make it easy for people to become acquainted with his company's products. Since the products are being designed with an uncompromising insistence that they be easy to learn and use, he hopes people will buy several other products in the company's forthcoming line. /PC

SOFTWARE/LAWRENCE J. MAGID

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Innovative Software Applications
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1150 Chestnut Ln.
Menlo Park, CA 94025
List Price: \$295 including manual

Proofreader
Aspen Software Co.
P.O. Box 339-P
Tijeras, NM 87059
List Price: \$129; manual \$8

programs. Correcting my spelling was never their idea of a good time.

I looked at SpellGuard and Proofreader. Both programs work with any DOS file. I tested them with WordStar and verified that they work with files created by EasyWriter 1.1, Volkswriter, and the DOS editor. Although there are important differences, both programs perform essentially the same function. They check the words in a file created by a word processor against their own dictionaries of correctly spelled words.

If the spelling program finds a word in your file that isn't in its dictionary, it flags the word as a possible misspelling, but the

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word is not necessarily misspelled. SpellGuard's dictionary, for example, includes "institution," but "institutionalized" is flagged as a mismatch. "Idol" is in the dictionary, but "idols" is not. When the program finds an unfamiliar word, it gives you the option of correcting the word, ignoring it, or adding the word to the program dictionary. On subsequent runs the program treats added words like all other words in its dictionary, no longer flagging them as possible errors.

Computerized spelling checker programs are not a substitute for human proofreaders. Programs can isolate unfamiliar words, but they cannot check for meaning, clarity, accuracy, relevance, punctuation, or other elements of writing. I once made the mistake of mailing a letter after running it through a spelling checker, later to find that it was missing an entire sentence.

SpellGuard

SpellGuard comes with a 20,000-word lexicon that can be expanded or supplemented by the user. The program is fast, easy to use, and elegantly designed. Innovative Software Applications (ISA) created SpellGuard and was its distributor until recently, when the program was acquired by Sorcim, the publisher of SuperColc. I tested the ISA version of SpellGuard, but I have been assured by Sorcim that there will be no significant changes in the near future.

After SpellGuard reads your document and flags words that are not in its dictionary, it asks you to determine whether those words should be marked for correction, ignored, or added to SpellGuard's dictionary. If you mark the word, SpellGuard replaces its last character with the bracket symbol ([) or whatever symbol you specify. You then return to your word processing program, use the search function to find all occurrences of that symbol, and correct the word that precedes it. SpellGuard doesn't provide you with dictionary help, so if you're not sure how to correct your errors, you'll have to look them up the old-fashioned way.

You can start SpellGuard in two ways. You can proof a file in "batch" mode by typing `SP FILENAME` (include the drive name if the file is not on the diskette in the active drive). In the batch mode, SpellGuard checks your entire file at one time, following its own commands. Or you can

Word Review Options

"Add correct word" (1 or A) adds the word to SpellGuard's dictionary. Often the mismatch is a name or a correctly spelled word that is not in SpellGuard's dictionary. The program wouldn't recognize computer terms, for example.

"Mark" (2 or M) places the [symbol at the end of the word. Use it if the word is spelled incorrectly.

"Ignore Word" (3 or I) causes the word to be neither marked nor added to the dictionary. Use this when SpellGuard finds seldom-used names or technical terms.

"Return to previous word" (4 or R) brings the program back to the word prior to the one you are checking. If you select the wrong action for a word, you can go back and correct your mistake.

"Help" (5 or ?) displays a summary of each menu option. This feature virtually eliminates having to refer to the manual.

"Exit" (6 or X) takes you to a special review menu. This advanced feature allows you to add all remaining words to the dictionary, mark all remaining words in the text file, ignore all the remaining words, or list the remaining words. This is also the area in which you can create a custom dictionary.

Figure 1: Sample SpellGuard Screen

# Words Read	# Words Unique	% Words Unique	# Words Mismatch	% Words Mismatch	% Proofing Done
1,250	436	34.8%	21	4.8%	100.0%

start the program interactively by typing `SP`, and then follow the prompts.

As it proofs, SpellGuard reports the total number of words and unique words in the document. The number of unique words is an indication of how often you repeat the same words. Figure 1 is an example of the screen as SpellGuard reads a document. Typical of many documents, only 34.8 percent of the words in our sample file are unique.

When the % Proofing Done column reaches 100 percent, SpellGuard tells you "Proof Reading Done" and instructs you to press any key to enter word review. When the word review menu appears (see Figure 2), you determine what to do with the mismatched words. The words are shown one at a time at the bottom of the screen. The menu items can be selected by a number or letter. The letter generally corresponds to the first letter of the desired action. Typical of the program's emphasis on convenience, pressing Enter is unnecessary when making a selection. Help statements are displayed by typing a question mark.

Advanced Features

Even if you never use SpellGuard's advanced features, it's nice to know that you can create your own dictionary or merge

two dictionaries into one. It's also possible to get a listing of all or part of the dictionary, to alter the default tables, and to switch from "beginner" to "expert" user.

The default tables determine such things as the dictionary used, the character used to mark misspelled words, or whether to preserve your original text in a file ending in .BAK. You can change the default settings to suit your writing style. If you use the [symbol frequently in your text, it would be wise to change the symbol used to mark mismatched words to a rarely used symbol such as the backslash.

Speed

Using a double-sided DOS 1.10 diskette, the program took 29 seconds to proof the 2,100-character sample letter included on the SpellGuard diskette. It took 35 seconds to read a 28,500-character file (about the size of this article), and 47 seconds with a 80,000-character (8,255-word) file. These measurements cover the time the program spent reading the file and checking each word against SpellGuard's dictionary. They don't count the time I spent deciding what to do about each word or going back into the word processing program to correct errors. Those times depend entirely on the person and the word processing

program.

SpellGuard's 112-page manual is well written, but the program is so easy to use you'll be tempted not to read the documentation. It's a good reference, however, and is essential if you want to use some of the program's advanced features.

Proofreader

Proofreader's exceptional features help make up for its slow speed, clumsiness, and poor documentation. Despite these complaints, it is a worthy and powerful program. Proofreader allows you to correct words in context, display alternative spellings, and look up words in its dictionary. It uses a Random House Dictionary of either 32,000 or 50,000 words rather than a lexicon put together by a software firm. The larger dictionary requires dual-sided disk drives.

Proofreader's documentation and screen prompts are somewhat unattractive. The program has an awkward feel compared to SpellGuard. Even the name of the file used to start the program is unnecessarily difficult to type. To execute Proofreader you type `PROOFDRR FILE-NAME` instead of something simple such as `SP, SPELL, or PROOF`.

Proofreader allows you to add words to its dictionary through an auxiliary dictionary called `AUXDICT.TXT`. At the end of the program you are required to type in the name of that file. If you don't remember it, you have to refer to the manual. It would have been nice if the `AUXDICT.TXT` function had been made a menu option or at least assigned an easier name.

On a couple of occasions the program locked up my keyboard so that my only option was to reboot the system. This hasn't happened often, and I have been

unable to replicate it, so I can't report when or why it happens. I may have been doing something wrong, but the program should be able to trap potential errors rather than force a system boot. Although annoying, all you lose is the time you spent working with Proofreader. Your document files remain on the diskette.

While typographical errors in manuals don't usually bother me too much, the nature of this product makes them stand out. The typographical error on page 4 of the Proofreader manual emphasizes an important limitation of this and all spelling programs: "Depending on your system configuration..." Spelling checkers are not substitutes for human proofreading.

How It Works

Unlike SpellGuard, Proofreader doesn't just mark your text; it allows you to correct it interactively without necessarily having to reenter your word processing system. Proofreader uses batch files to drive the programs that do the work. A batch file is a group of programs chained together and executed as one program. Type `PROOFDRR B:FILENAME` (assuming your file is on the diskette in drive B) to initiate the program. `PROOFDRR.BAT` is a batch file that runs a program called `PROOFDRR.EXE`. I don't like typing commands that are long or difficult to remember, so I renamed the file `PROOF.BAT` and it works fine.

Once initiated, Proofreader begins by reading your text file and remembering all the unique words in it. According to the manual, it has the capacity to handle a source document with over 3,000 unique words or a total of over 15,000 characters. If it finds more, it asks you to split the file. But as the manual points out, and my experience confirms, most documents have far

fewer than 3,000 unique words. I tested the program on a 64K system, and it successfully checked a 60,000-character file with 1,200 unique words.

After the file is read, Proofreader displays "Sorting" while it sorts the words. It then tells you the number of different words found. Unlike SpellGuard, which displays total words and total unique words, Proofreader displays only the unique words.

Once your file is sorted, Proofreader checks the file against its master dictionary. When it's finished checking the master dictionary, it looks for an auxiliary dictionary called `AUXDICT.TXT`. If it doesn't find `AUXDICT.TXT`, it asks you to enter the names of any auxiliary dictionaries.

SPELLGUARD
*is so easy to use you'll
be tempted not to read
the documentation.*

After all checking is complete, Proofreader displays the following menu.

Select Any Option:

- C—Correct file SPELLER with PROOF-EDIT.
- D—Display unknown words on screen.
- E—Exit from Proofreader.
- G—Grammar: check file with GMK.
- P—Print unknown words on printer.
- R—Review and edit unknown words.
- S—Save unknown words in file: SPELLER.BWD

I usually start with "display unknown words on screen" (D) just to see what damage I've done to the English language. Assuming I will find some errors, I proceed to C. "Correct file SPELLER with PROOF-EDIT." The "Review and edit unknown words" option R saves you time later when you go to correct the file, but I'm not convinced it's a net gain. You can also "Save unknown words in a file" S and correct them later.

Unlike SpellGuard this phase of Proofreader makes no marks on your text. All the incorrect words are written to a file ending with the suffix `.BWD` and beginning with the prefix of the file you are checking.

Figure 2: SpellGuard Word Review Menu

Press	In Order To
1 or A	ADD correct word to dictionary
2 or M	MARK incorrect word with symbol '[' in text file
3 or I	IGNORE word (Will not add to dictionary or mark)
4 or R	RETURN to previous word for re-reviewing
5 or ?	HELP—show instructions on what to do next
6 or X	EXIT Regular Word Review and enter SPECIAL REVIEW

Recap for Prior Word	Current Word for Reviewing
Word <Action Chosen>	Number Word (your response)
	DAER

Pressing C automatically takes you out of the Proofreading program and into the Proof-EDIT program. There you are given three ways to correct your file. Below is the initial correction menu screen.

C—Interactively correct unknown words.
M—Mark unknown words in file with #.
W—WordStar mode: Correct + mark if change width.

Enter C, M, or W—

The interactive mode (C) is usually the one to use. Marking the errors (M) places the # symbol at the end of each error, requiring that you enter your word processing program to make the correction. That

slows you down and defeats one of Proofreader's best features. The WordStar mode (W) is more trouble than it's worth. Its purpose is to let you know if a correction has caused a line length change. This feature is important if you right-justify your files, but using it requires you to reenter WordStar, search for the + symbol, and reformat each paragraph that has been changed. I find it easier just to reformat the entire document using WordStar's automatic reformatting routine ('Q' 'Q' 'B).

Interactive Correction

When you enter interactive correction

mode, Proof-EDIT scrolls your document on the screen. When it finds a possible misspelling, it pauses and asks you what to do. Your options are displayed on a menu. The program also displays the line containing your misspelling to let you see how the word is used. A question mark appears below the possible misspelling as in the example shown here:

The program checks your file for any spelling errors.

- ?
***** unknown word: spelling
Word correction mode—Options
A—Accept word for rest of session, don't learn
C—Correct word, prompt will follow
D—Dictionary help. Find a word in dictionary
E—Exit—accept word and discontinue checking
L—Learn word for auxiliary dictionary
O—One time acceptance of word
A, C, D, E, L, O, (H for Help)?
"Accept word" [A] directs the program to accept the word for the rest of the session. This command is identical to the ignore command in SpellGuard. "Correct word" [C] is used to replace the bad word with the correct one. Once C is selected, Proof-EDIT prompts you to: "Enter exact replacement." If the corrected word is in Proofreader's dictionary, the scanning continues until another error is found. If the word is not in the dictionary, Proofreader tells you so. For example, if I correct "speeling" with "spilling," Proofreader checks its dictionary for "spilling," and when it doesn't find it, displays the following menu.

*** Replacement not in dictionary!
*** Unknown word is now: spelling
Options now:
A—accept that spelling and continue
C—correct word again
D—Dictionary help
"Dictionary help" is another feature that sets Proofreader apart from its competition. If you request dictionary help, Proofreader displays three rows of words that approximate the spelling of the word you are checking. If your spelling errors are like most, this list probably includes the right word. If Proofreader flags "speeling" as a mismatch and you enter D for dictionary help, Proofreader would ask you to: "Press Return only to look up

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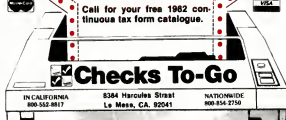
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spelling." It would then display the following list:

Looking for: speed		
speeded	speeder	speeders
speedier	speediest	speedily
speeding		speedy
spell	spelled	spelling
spells	spend	spender
spenders	spending	spends
spendthrift	spent	sphere

Choose among the words. If one of them is the spelling you are looking for, enter C (for correct) at the next prompt and Proofreader will accept the correct word and proceed to the next error.

You don't have to have an error to look up a word. You can type in a word to check if it is in the dictionary.

"Learn" (L) is similar to the "Add word" function in SpellCuord. "Learn" writes words you want to add to the dictionary into the auxiliary file usually called AUXDICT.TXT. As long as AUXDICT.TXT has less than 100 words, the process is quick and automatic. Proofreader comes with a dictionary edit program that is used to merge AUXDICT.TXT into the master dictionary. The process takes several minutes but is not used often.

Speed

Proofreader reads a 60,000-character file in about 80 seconds and checks its master dictionary in an additional 90 seconds. It can read shorter files more quickly. It took about 8 seconds to read the 2,100-character sample file that came with SpellGuord, but the time for checking the dictionary is unrelated to document size.

Although slower than SpellGuord, Proofreader's features help make up for its sluggish performance when proofing and checking its dictionary. Proofreader's interactive correction mode eliminates the time it takes to go back into your word processing program to find and correct errors. And Proofreader's dictionary eliminates the need to look words up manually.

I wish it were possible to declare a winner in this spelling bee. Both programs have their outstanding features, and both have their limitations. SpellCuord does what it does faster, but Proofreader does more. Because of its dictionary help and interactive correction features, Proofreader is the more powerful product and the one I use most often with major articles and important letters. When I'm in a hurry and want to verify the accuracy of a letter,

I use SpellGuord.

The choice depends upon the type of work you do and the type of errors you make. It's a little like choosing between shopping at a supermarket or a convenience store. If you're a good speller and

make mostly typographical errors, SpellCuord is your quickest and most convenient way to check for accuracy. If you're a weak speller and frequently find yourself referring to a dictionary, Proofreader is your full-service program. /PC

SOFTWARE/KAREN PHILLIPS

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EasySpeller is a spelling checker program that is helpful for anyone who composes on a PC while using a dictionary. It's a comprehensive error-detection program that is menu driven, has self-explanatory user prompts, and makes full use of the PC's function keys.

A word list, or lexicon, of 88,710 word roots and variations forms the base of EasySpeller. In addition to the standard lexicon, custom lexicons are built for specialized terms, trade names, product codes, names and addresses, or any other list that is often referenced. These custom lexicons, used with the standard EasySpeller lexicon, can be used concurrently or interchangeably, tailoring the program's capabilities to the user's special needs.

Requirements

This program requires a system with at

least 64K of memory, two disk drives, and an 80-column display. The EasySpeller program diskette uses drive A while a working diskette with the text files uses drive B. It runs under PC-DOS, but since some of the DOS commands are used with EasySpeller for checking and maintenance of the data diskettes, the following commands should also be on the EasySpeller program diskette: CHKDSK, RENAME, COPY, DIR, ERASE, and TYPE. You can create and edit text files under a number of word processing programs including EasyWriter 1.0, Word-Stor, Volkswriter, and the DOS editor.

Ease of Use and Documentation

EasySpeller is one of a growing number of user-friendly software packages. The program's pleasantly arranged and informative menu screen, frequent prompts, and status statements during operation are helpful in guiding you through the checking steps.

Since the program provides numerous prompts, you might be tempted to avoid reading the documentation. However, reading the manual and performing the

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tutorial exercises is well worth the time and effort. The documentation is professional, readable, and complete. Within a few hours you can perform the functions on your own text files. The documentation is divided into three sections: Introduction, Tutorial, and Details. The Introduction includes general information about EasySpeller and instructions on setting up the system. Included are detailed commands for copying the DOS system and commands to the program diskette, formatting a data diskette, and even writing on the diskette labels. The tutorial provides seven exercises to familiarize you with the programs. Step by step, features are added to material already covered, allowing you to master each function before a new one is introduced.

Unfortunately, the EasySpeller program diskette is copy protected, so a backup copy must be purchased for \$15. If the program diskette is damaged at the time of purchase, a free replacement is available for 90 days. Phone Support, a customer service from Information Unlimited Software, makers of EasySpeller, is also available for an annual fee of \$35.

Program Operation

Once the system is booted, the EasySpeller Selection Screen appears, as seen in Figure 1. Five options enable you to: make a spelling check from a DOS file, check the program diskette for damage, or exit EasySpeller to DOS to display or print a corrected file. To do a spelling check, the File Selection Screen lists all available

Figure 1: EasySpeller Selection Screen

```
C -> Spell-check a DOS file
V -> Verify the integrity of the
    EasySpeller
    Diskette
M -> Move DOS file into/out of EasyWriter
    (1.0) file
T -> Create a Tutorial Diskette
X -> Exit the EasySpeller System
```

Please type C, V, M, T, or X to select a
function: _____

The most heavily used option, C, allows you to do a spelling check from a DOS file, while V checks the program diskette for damage. To copy EasyWriter 1.0 files to DOS and vice versa, use option M; to copy practice exercises from the tutorial, use T. X is for exiting EasySpeller to DOS.

files on drive B (see Figure 2). Enter the name of the file to be spell-checked from those listed. The program will then ask if any custom lexicons are to be consulted in addition to the standard lexicon. If only the standard lexicon is used, press Enter and the program checks the desired file. If custom lexicons are also consulted, enter the names of the lexicons, such as geology or business.

CORRECTING
*a word within the
context of a sentence is
a simple procedure.*

You can create custom lexicons by entering data into them during the corrections work function. Five custom lexicons can be used concurrently, allowing specialized terms to be in separate files rather than in one auxiliary file. The separate lexicons can then be used as needed. After EasySpeller checks the words in question errors can be corrected in context or a file can be created using the editing mark or two exclamation points before each questionable word. If errors are corrected in context, the program advances to the EasySpeller Work Screen (see Figure 3). With the file option, the program asks for the name of an output file and then returns to the Selection Screen.

Making Corrections

Correcting a word within the context of a sentence is a simple procedure. Since the cursor stops at the beginning of the word in question, you simply space over to the correction area of the word and make the correction, deleting the incorrect letter. Press Enter and the cursor returns to the beginning of the word. With the F3 key the corrected word is again compared against the lexicons and the F1 key tells the program to continue on to the next mismatch in the file.

Once a correction has been made, any similar errors encountered later receive an implied suggestion for correction below the highlighted word. To make the correction, press the F5 key. If the same

Figure 2: File Selection Screen

Available File on Drive B				
DECL.TXT	GENES.TXT	LETTER.TXT	MEMO.TXT	WHALES.TXT
Enter filename to be spell-checked:				
Enter filename to use as a custom lexicon (or ENTER key):				
After selecting option C, the File Selection Screen will list all available files on drive B.				

Figure 3: EasySpeller Work Screen

F1 \blacktriangleright Proceed forward	F2 \blacktriangleright Undo current attempt
F3 \blacktriangleright Verify from cursor	F4 \blacktriangleright Mark current position
F5 \blacktriangleright Apply suggested correction	F6 \blacktriangleright Add to custom lexicon
F7 \blacktriangleright Exit	F8 \blacktriangleright Replace throughout file
There will be a meeting of the Christmas Party Planning Committee.	
Stopped on document line 1	
EasySpeller does not recognize this word at all.	
Custom Lexicons Used	
1 = names.lex	
2 = product.lex	
3 = codes.lex	

The top half of the Work Screen shows how the PC's function keys are used in the program. In the middle of the screen the message window displays a line of text with the possibly misspelled word highlighted in green, and at the bottom it notes the mismatched word's location and explains why it stopped at that word. Also listed in the lower right-hand corner are the custom lexicons used during the spelling check.

correction is desired throughout the file, press F8 and then F1 to proceed forward in the file. Mistakes made in correcting a mismatched word can be undone, and words can be marked with double exclamation points for future editing. The program can be returned to the Selection screen at any time.

With custom lexicons, words and literals can be easily added. If, for example, you want to add "ultra-suede" to your custom lexicon, just add the word and press = to indicate it is a literal term; give the custom lexicon number (such as "3 product.lex") and go on. You can also update the appropriate DOS file with recent corrections before exiting the program, and you can create a log file that will allow you to see at a glance all the corrections made during a spell-checking session. The log file includes the name of the document, the line number of the questioned word,

the original spelling of the word, and the corrected spelling. Once a document has been corrected, the original file is saved with .BAK and the corrected file becomes the new filename.TXT.

Final Thoughts

EasySpeller is a complete spelling checker that is as easy to learn as it is to use. The prompts and function keys make for quick corrections. The standard lexicon is large, with its word forms and roots, and since the custom lexicons are easily built, the numbers of words and literal expressions checked there are vast. A major drawback is that EasySpeller does not provide the user with a list of suggested spellings for the mismatched words it shows. Considering the valuable features of this program, users will be surprised that they still need to sit at the computer with dictionaries on their knees. /PC

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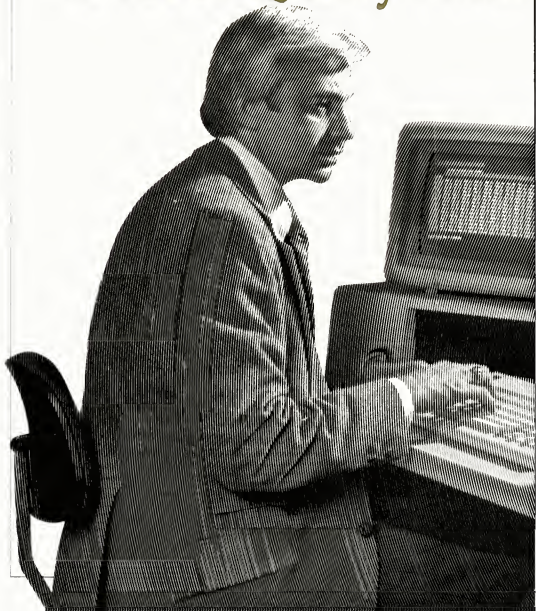
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How To Choose A Letter Quality Printer



users are at no loss for
options when selecting a
machine that builds
character on paper.

When you think of electric typewriters, it's
likely you think of IBM. And yet,
when IBM announced the Personal Com-
puter, this office-typewriter giant ignored
the obvious and put its label on an Epson
dot matrix printer. Although many inde-
pendent suppliers leaped into the void to
sell typewriters and letter quality print-
ers (LQPs) compatible with the PC, IBM

waited a year to get around to offering an
LQP as part of the PC's optional hardware.

That official printer is the NEC Spin-
writer Model 3550, though it wears IBM
clothing. The same printer, with its NEC
label, has been available at a limited num-
ber of outlets (including some Sears Busi-
ness Centers and ComputerLand stores)
for several months. Whichever label this
printer wears, it was designed especially
for use with the PC.

Because that PC-specific LQP arrived
almost a year after the first PCs, however,
a great many users couldn't and didn't
wait for this specially designed printer.
These people have been utilizing a selec-
tion of other LQPs, with varying degrees of
compatibility and with varying results.

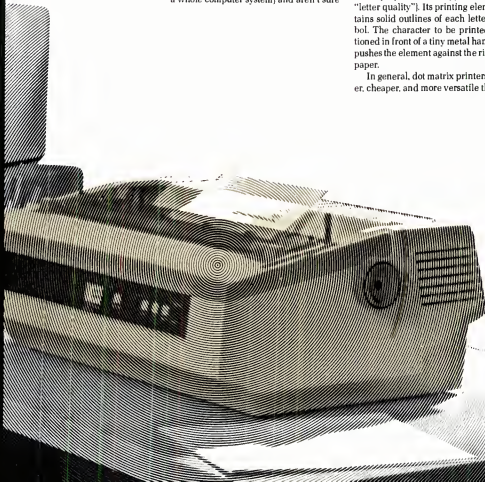
If you are in the market for a printer (or
a whole computer system) and aren't sure

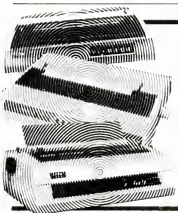
what type of printer to buy, the discussion
that follows is for you. If you know that you
want an LQP or are trying to make the one
you already have work properly with a PC,
the User Guide to Printers in this issue
should help.

LQP Advantages

The generic names of the two common
types of computer printers accurately de-
scribe their output. A dot matrix printer
deposits a series of closely spaced dots in
the pattern of the desired letter, number,
or symbol. It uses a print head made up of
tiny wires that can be activated independ-
ently to push the ribbon against the paper
according to an electronic instruction for
each character. An LQP produces fully
formed characters like those in a business
letter prepared on a typewriter (hence,
"letter quality"). Its printing element con-
tains solid outlines of each letter or sym-
bol. The character to be printed is posi-
tioned in front of a tiny metal hammer that
pushes the element against the ribbon and
paper.

In general, dot matrix printers are fast-
er, cheaper, and more versatile than letter





ANYONE WHO writes letters, prepares contracts, or produces reports will find the LQP an indispensable part of a word processing system.

quality printers in the size and variety of characters and shapes they can print. But they cannot print solid, fully formed characters, and the pattern of dots they form is always confined to a matrix of horizontal and vertical lines (quite similar to that of a video screen or monitor). Although dot matrix printing is relatively easy to read, it is not as professional looking as letter quality printing and it has traditionally been associated with the common prejudices against computers.

To avoid the negative biases some people still harbor about the Computer Age, as well as to produce office-typewriter-quality pages, many microcomputer users have opted for the slower, more expensive LQPs. The LQP has replaced the typewriter in thousands of offices; anyone who writes letters, prepares contracts, or produces reports as part of doing business will find the LQP an indispensable part of a word processing system. Most writers who have converted to computers for their work also use LQPs because editors and publishers are accustomed to reading

typewritten manuscripts.

A Wide-Open Field

During the 10 months before an LQP made specially for the computer was available, PC users were at no loss for options in choosing an LQP. The cost of LQPs has been decreasing steadily, and the number of models and manufacturers has been growing just as rapidly. A year or two ago a buyer could spend \$2,000 to \$4,000 for an LQP or \$500 to \$800 for the electronics to convert certain typewriters into low-speed computer printers. Today, the distinctions between printer and typewriter have blurred, the costs have come down, and the speeds have improved.

Given these changes in little more than 2 years, the future is bound to present more choices and features in LQPs. Regardless of these improvements, however, the basic operation of an LQP is likely to remain substantially the same—an embossed plastic or metal printing element striking ribbon to leave its impression as a solid line of ink on paper.

Three Types of LQPs

There are three types of LQPs: the original models, which print at 25 to 80 characters per second (cps), the newer 12- to 18-cps models, and the converted typewriters, which print at rates of 12 to 15 cps. All three types function as LQPs when connected to a computer, and some of them may also be used as conventional typewriters. Deciding which type of printer to purchase depends on your needs and on the built-in features of both the printer and the programs you will use.

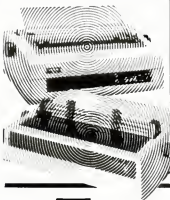
Converted Typewriters

These are the least expensive LQPs, and one of the conversion kits may be compatible with the typewriter you already have. Generally, a typewriter-to-printer conversion can be made on an electric or electronic typewriter. The difference between the two is that the electric typewriter uses a manual operation (pushing down a key) to produce a character; an electronic typewriter can receive a signal that designates a character, so the mechanical operation isn't always necessary.

To convert an electric typewriter for use with a PC, special devices are available that fit over the typewriter's keys; each time the signal for a character

reaches this device, a plunger strikes the appropriate key. Such conversion kits also have a small box of electronics that routes the signals from the computer to the typewriter device. (These "kits," by the way, are not like model airplanes or electronics projects that you assemble; you merely have to install the keyboard device and connect the control box by cable to the computer.) When you want to liberate the typewriter from its plungers, you can usually lift off this special cover and operate the machine the old way.

Another common form of converted typewriter utilizes an electronic module along with an external signal box or a control card that is installed inside the typewriter's case. Both of these devices control the printing with electronic signals, bypassing the keyboard altogether. When the machine is not working as part of the computer system, it can be used as a typewriter. Several such conversions of the Olivetti



TODAY, the distinctions between printer and typewriter have blurred, the costs have come down, and the speeds have improved.

Praxis electronic typewriters are available for the PC.

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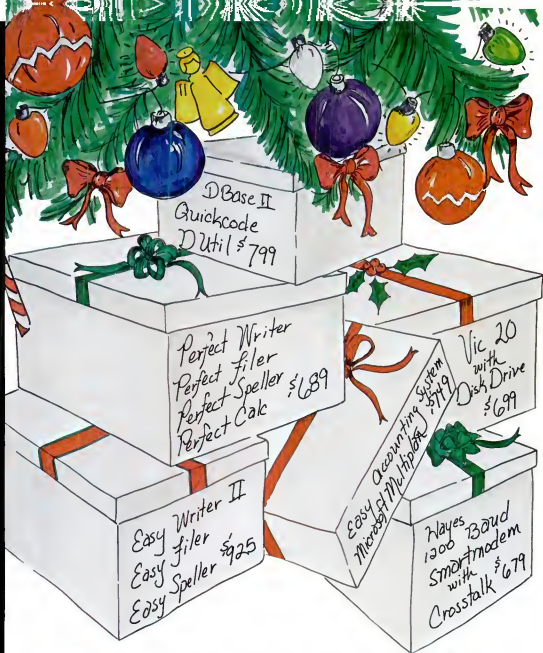
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Conversion mechanisms offer low-budget alternatives for professional-style printing, but they can also cause more wear on a typewriter than conventional use. If you operate a converted typewriter continuously at its top speed (usually 12 to 15 cps), some of its 2,000 to 3,000 parts could move out of alignment or even fail sooner than under normal office conditions. Make certain that you can obtain service for your typewriter and that you will not void your warranty or maintenance contract. This is not to say that you shouldn't consider using a converted typewriter as a printer; IBM offers a converted electric as the low-cost printer with its Displaywriter word processing system.

Expensive, Low-Speed LQPs

The latest group of LQPs to hit the market includes several printers that operate at relatively slow speeds (12 to 18 cps) and are manufactured by typewriter companies. Smith-Corona and Brother, for example, offer LQPs for about \$1,000. Although these machines do not have keyboards and cannot function as conventional typewriters, they are subject to less wear because of their smaller number of parts and their design for use with a computer. They are also comparable in price to many of the converted typewriters, and they don't have the external control boxes or keyboard covers that some of the converters require. This type of printer may be the appropriate option for you if you don't need a typewriter (such as if you already have one that can't be converted) and you must keep your spending to a minimum.

Moderate-to-Expensive, Medium-to-Fast LQPs

The top-of-the-line LQPs include several machines from well-established manufacturers and a newcomer that is currently the fastest of the bunch. The medium-speed machines include the NEC 3550 Spinwriter (the official IBM LQP, as noted previously), and other models of NEC's 3500 series, all of which print at a top speed of 33 cps and sell for \$1,800 to \$2,350. NEC also makes 55-cps Spinwriters (formerly the 5500 series, now called the 7700 series); these printers sell for \$2,500 to \$3,600. Comparably paced and priced LQPs in this category are offered by Diablo, Qume, and C. Itoh, and the Fujitsu printer outpaces all others at 80 cps (at a cost of about \$3,000).

See the "User Guide to Printers" accompanying this article for a list of manufacturers, model numbers, features, and prices of LQPs that have been reliably interfaced with the PC.

Daisy Wheels and Thimbles

Most LQPs and recent-model electronic typewriters use a daisy wheel as the printing element. The daisy wheel is a small plastic or metal disk that has a recessed area at the center and 90 to 100 petal-like pieces radiating out from the center (Figure 1). At the end of each petal is an embossed character. When the daisy wheel is attached to the printer, it spins according to the electronic signals that indicate the characters to be printed. The appropriate letter or symbol is lined up in front of the hammer and is struck from

behind it; the character hits the ribbon and is printed on the page. Considering that this sequence happens from 12 to 80 times per second, you can begin to guess why an LQP's cost is in the \$1,000 range.

Not only is great speed required for daisy wheel printing, but precise tolerances must be met so that all characters are printed at equal distance from one another and with equal horizontal and vertical alignment. If a printer is not producing properly spaced text, the problem may be one of two things: either the daisy wheel's positioning mechanism may need adjustment (which must be done by someone experienced at this task) or you have a poor-quality daisy wheel. A change in daisy wheels can tell you if it's the latter problem. If the capital letters all print a little higher or lower than the lowercase letters, the print mechanism needs adjusting.

If you use daisy wheels, be sure to inspect them carefully at the time of purchase. Occasionally you'll find one that is missing part of a letter, usually the top of an h, the bottom of a p, or a similar stem-like portion.

One manufacturer—NEC—uses thimbles instead of daisy wheels in its LQPs. The thimble resembles its namesake and is essentially a daisy wheel that has had every petal folded upward in the middle (Figure 2). Because of its flat surface and vertical position in the printer, the daisy wheel must travel farther to print a series of different characters than does the thimble, which is positioned horizontally and has all its characters closer to the hammer than a daisy wheel. This is one reason why



Figure 1: A Daisy Wheel



Figure 2: A Print Thimble



Figure 3: Special Printing Features

NEC's top-of-the-line printers are faster than most daisy wheel printers with comparable technology. (The one exception is the 80-cps Fujitsu, which uses a special gear, called a worm drive, to move the printing element from side to side. This smoother and faster action accounts for much of its increase in speed.)

Size of Characters

Both daisy wheels and thimbles are interchangeable, and most LQPs accommodate two or three sizes of type as well. Type size is commonly described in terms of its pitch, which is measured by the number of characters that can be printed in 1 inch. The standard pitches are 10 (which prints 10 characters to the inch and corresponds to pica type on a typewriter) and 12 (which prints 12 characters to the inch and corresponds to elite type). A less common size is 15 pitch, which produces characters about the size of type used in classified ads. In addition, some LQPs are capable of producing proportional spacing, using a daisy wheel or thimble that contains letters that vary in size (similar to the type used in magazines and books). Proportional spacing requires special codes for each letter, however, and these must be used by the software controlling the printer.

A few printers are capable of printing at one pitch only, although they may offer a selection of type styles within that size. These more limited LQPs are generally the less expensive ones, along with some models of converted typewriters. If you aren't converting a typewriter that you already own, you would be wise to determine whether the printers you consider will accommodate at least 10- and 12-pitch elements, because the price of printers that offer this versatility may be close to that of single-pitch machines.

Bidirectional Printing

Another built-in capability in many letter quality printers is bidirectional printing. This is just what it sounds like—printing while the daisy wheel or thimble is traveling in either direction—and it allows greater speed and causes less wear than a comparable amount of printing by a machine that must return the print element to its leftmost position after each line is printed. A few of the low-cost LQPs cannot print bidirectionally and, not surpris-

Letter Quality Printer Spec Sheet

The following letter quality printers have been tested for performance and, to the best of our knowledge, can be reliably interfaced with the IBM PC.

Printer/Supplier	Model	Speed (cps)	Special Features	Type of Interface	Price*	Comments
BROTHER Kanematsu Goshu, USA 333 South Hope St. Los Angeles, CA 90071 (213) 626-1123	HR-1	16	few	parallel serial	\$900- \$1,200	bidirectional cassette daisy wheel
BYTEWRITER (uses Olivetti Praxis 30) 125 Northview Rd. Ithaca, NY 14850 (607) 272-1132		12	few	parallel	\$795	internal interface
COMRITER Comrex Int'l Inc. 3701 Skypark Dr. #120 Torrance, CA 90505 (213) 373-0280	CR-1C	16	few	parallel	\$1,115	identical to Brother HR-
DIABLO Diablo Systems 26480 Corporation Ave. Hayward, CA 94545 (415) 786-5200	830	40	many	parallel serial	\$2,400- \$3,000	can use plastic or metal daisy wheel
ESCON TYPEWRITER INTERFACE (for Olivetti or IBM electronic Selectric) Escon Products 12919 Alcosta Blvd. San Ramon, CA 94583 (415) 820-1256				parallel serial	\$435- \$599	switch for mode select
FUJITSU Fujitsu America 2945 Oakmead Village Ct. Santa Clara, CA 95055 (408) 727-4300	SP630	60	many	parallel serial	\$2,800- \$3,600	can use plastic or metal daisy wheel
C. ITCH STARWRITER Leading Edge Products 225 Turnpike St. Canton, MA 02021 (800) 343-6833	F-10	40	many	parallel serial	\$1,895	includes serial and parallel interfaces
NEC SPINWRITER (also IBM) NEC Information Systems 5 Militia Dr. Lexington, MA 02173 (617) 862-3120	3550 3500 series 7700 series	33 33 55	many many many	parallel parallel serial parallel serial	\$2,350 \$1,800- \$2,300 \$2,500- \$3,600	made for the PC new series excellent record of reliability

Printer/Supplier	Model	Speed (cps)	Special Features	Type of Interface	Price*	Comments
AXIS ELECTRONIC TYPEWRITER Livetti 15 White Plains Rd. Harrystown, NY 10691 (4) 631-3090					\$500- \$700	several conversions available
TIME Time Corporation 50 Qume Dr. San Jose, CA 95131 (8) 942-4000	Sprint 9	45 55	many many	parallel serial	\$2,400- \$3,000	newly design- ed for easy maintenance
ILLUM HC 40 Charcot Ave. San Jose, CA 95131 (8) 263-9510	N-35 N-77 F-86	33 55 80	many many many	par & ser par & ser par & ser	\$2,495 \$3,295 \$2,900- \$3,600	all models have 16K buffer and 3 major protocols
SMITH-CORONA Smith-Corona Locust Ave. New Canaan, CT 06840 (3) 972-1471	TP-1	12	few	parallel serial	\$750- \$900	unidirectional printing only
SMITH-CORONA STRASONIC (Typewriter with SuperCord) Bany Typewriter & Computer 3 San Pablo Ave. Bany, CA 94706 (5) 528-1959		10	few	parallel	\$795	converted typewriter
PERCORD (interface for Smith-Corona ItraSonic typewriter) Perd Limited 48 Brookhollow Dr. Santa Ana, CA 92705 (4) 751-3587					\$395	
PRINTSOFT Software for serial inter interface International Computers P.O. Box 13547 Mexico Beach, FL 32410 (4) 648-8484					\$79.95	

*Prices are ranges compiled from advertising.

ingly, a conversion kit does not give this capability to a typewriter.

Paper Feed

LQPs generally handle paper in much the same way as typewriters. The paper is held between the platen and the body of the machine, and it advances as the platen turns. Of course this advancement of the paper happens automatically in a printer, because the computer's signals to the printer include instructions to turn the platen after a line has been printed and to move the paper out of the machine when the printing is completed.

LQPs can handle paper in two ways that typewriters cannot. Because of their ability to advance paper automatically, printers can use continuous-form paper (also called fanfold), which consists of standard-size sheets joined by perforations at the top and bottom. Most continuous-form paper also has perforated, detachable borders on each side; these border pieces contain evenly spaced holes that fit into the pins on a "tractor"—the second LQP advantage over a typewriter's paper handling. For long printing jobs, and particularly for high-precision tasks such as printing labels, a tractor feed mechanism for the printer may be essential. This rather unwieldy paper guide pulls the paper through the printer and keeps it from creasing or slipping sideways, which is fairly common when using friction feed for a long job.

Noise

One last, unfortunate characteristic of all LQPs is their noise. Although foam insulation inside the printer's cabinet and a sound-absorbing pad underneath the machine can lessen some of the rat-a-tat-tat, the decibel level of any LQP will make thinking or conversing difficult or impossible while the printer is in operation. One solution to printer noise is a special sound-controlling cabinet, but this product costs \$500 or more.

Printing Speed

The speed of LQPs—and all printers for that matter—is one of their most widely touted features. The printer's ability to turn out work on time may be crucial to the survival, or at least the credibility, of a business. Yet the claims made about various printers' speeds and the machines' ac-

tual performance may be quite different. Actual speed depends on the software controlling the printer, the format of the document being printed, and special printing features such as underlining or boldface.



COMPARE actual printing speeds rather than advertised test results.

LQPs fit into two speed groups: the slow typewriter-like models (12 to 18 cps) and the medium-to-fast ones (25 to 80 cps). These figures, which generally are cited in the manufacturers' literature and advertisements, are often measures of a printer's "burst" speed—its fastest run when printing unadorned text. Burst figures are like the estimated miles per gallon featured in every ad for a new car; they are useful for rather sketchy comparisons but they must be taken with a hefty grain of salt. (For the results of PC's own speed test along with a copy of the test, see the "PC Speed Test for Printers.")

Whatever the advertised speed of an LQP, the real issue is the machine's production of printed pages. Production rates vary among printers, but it is possible to translate characters per second into an approximate figure for minutes per page. For example, a medium-speed LQP (advertised at 25 to 35 cps) will print a full page of single-spaced text, such as a business letter, in about 1½ to 2 minutes. A slow LQP or converted typewriter (12 to 18 cps advertised speed) will take anywhere from 3 to 6 minutes for the same printing job.

When these figures are considered as part of office production time and another ½ minute is added to allow for inserting individual sheets of stationery for business letters, the printer's speed has an obvious impact on the day's work.

The best way to determine a printer's speed and usefulness is to see it in action with a job you would really assign it. In most instances this means making the rounds of dealers and computer-owning friends with your own ready-made test on disk, hooking up to each printer you're considering and timing the printing job with a stopwatch. If you test all LQP candidates this way and under the same conditions, you can use the results to rate the printers and to project how long each machine will take for the volume of work you must perform.

The key measure of what type of LQP you need—fast and more costly or slower and less costly—is the tasks for which you will use the machine. You should also anticipate future needs. There's no sense in saving a few hundred dollars on a slow printer if your work load will keep that machine printing all day (and thereby slow up all your other work on the computer) or threaten to overload it in the future. If you can stretch your budget at all, it would be wise to buy a printer that is faster than you presently think you'll ever need. A few months down the road, when deadlines are hovering, that formerly astounding 35 cps may seem to drag, and 18 cps may resemble a very loud snail.

Special Printing Features

Certain other built-in capabilities separate the more sophisticated LQPs from the bread-and-butter models. In most instances these features are controlled by software, such as the various word processing programs available for the PC. For certain types of business documents or professional manuscripts and reports, printing enhancements such as boldface type, underlining, and subscripts or superscripts could be essential. Most LQPs that can do any one of these operations can usually do all three because the printer simply must type a character and either not advance or back up to the previous position and then type another character. Thus, any printer or typewriter with a backspace key should be able to perform these operations.

The alternative type of boldface printing, as well as a variety of other manipulations of spacing between characters, is accomplished through microspacing. LQPs that offer this feature can be directed by software to print characters closer together or farther apart than the regular 10- to 12-pitch type. Usually this variable spacing is done in increments of 1/120 of an inch; for example, boldface characters are often printed by making one impression of a letter, then reprinting that same letter 1/120 of an inch to the right. Shadow printing works the same way except that some software allows the user to specify how many times each character will be printed, offset by 1/120, and reprinted.



IBM DID NOT offer an LQP when the PC was released, so users and dealers were left to their own resources for the tricky job of finding compatible printers.

Microspacing is often used to make text more readable, to design dramatic headings or passages of text, and to compress text so that more words fit on a page. In addition, much of the software that is capable of justifying text uses microspacing to even out the spaces between words and letters within words. Examples of text printed with variations in microspacing are presented in Figure 3.

Even if a printer cannot do microspacing, it might be able to print justified text. Like most such features, this one is so

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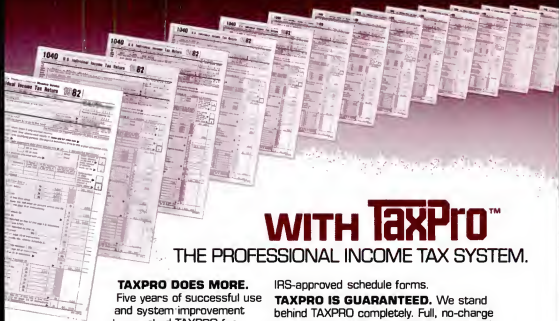
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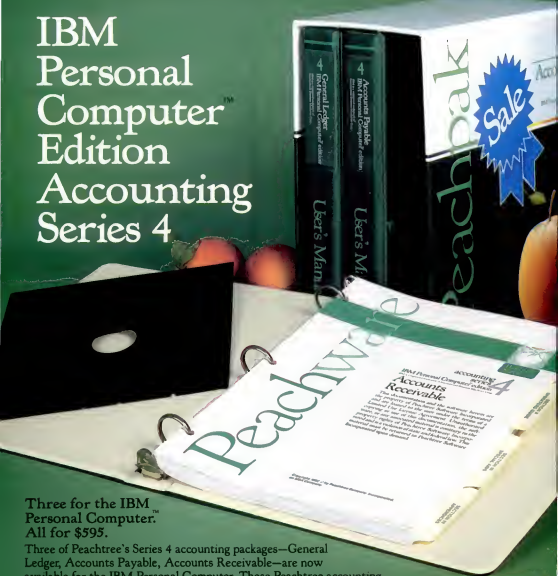


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controlled; the nonmicrospaced version of justified text creates the same right margin for each line but spreads the text to meet that margin by adding spaces between words (not between letters). At one of the popular word processing programs written for the PC uses this method of justification.

Many of the simple LQPs are limited to using single- or double-spaced text (possibly space-and-a-half or triple-spaced). With appropriate software can be more advanced printers can print superscripts and subscripts by moving the line a half-line up or down.

In addition, these printers can usually be reprogrammed to space lines in any increment of 48ths of an inch. For example, sin-

gle-spacing prints six lines per inch, so each line is 8/48 of an inch high. To achieve a slightly more open look to a page without going to space-and-a-half (which would be 12/48), you might specify a line height of 9/48 or 10/48. This flexibility in line spacing can be very useful when you want to limit a document to a single page but have too much text for the conventional format.

Interfacing: The Critical Connection

IBM did not offer an LQP when the PC was released, so users and dealers were left to their own resources for the tricky job of finding compatible printers and making them work properly with the new computer. As 10 months of free-form interfacing have proven, this was not always

easy. Technical advisors from IBM and the dealers' experiences with connecting printers to other types of systems were helpful, but the PC's resident hardware and initial software made the job more difficult.

The early hardware complications involved the type of interface available for the printer. Either a serial port (RS-232C) or a parallel port (Centronics compatible) is needed to send signals to a printer, and neither port is included in the basic system unit of the PC. Most users purchase a monochrome display (or a comparable monitor) with the basic computer, however, and a parallel port is included as part of the board used to operate the display.

A serial port is included on the asynchronous communications board, which

How to Tame Your LQP

Print hints for clean, letter quality copy.

After quality printers have more features than a typewriter, and sophisticated software can provide still more printing possibilities. Using a printer is not always a matter of rolling in paper and pushing a button. Here are hints to make your printing easier, faster, and error-free.

For a quick printing job, you can use an LQP almost as if it were a typewriter. Simply write the text on the screen exactly as you want it to print, and then use the Print Screen function of the PC to copy the screen's contents. The position of the paper in the printer will affect the placement of the text on the page, but you can quickly learn the screen-paper relationship by experimenting.

If you use several different types or sizes of paper, such as business letterhead, personal stationery, or envelopes, you can make a simple paper-insertion guide by attaching a small label or piece of tape to the top of the printer. Mark the spot where the left edge of each type of paper should be when inserted into the printer; print placement will always be the same. If you use a tractor-feed mechanism for some printing jobs, be sure to make a guide for it too, because it may require slightly different paper placement.

Make a similar guide to remind you

how far to roll the different sheets of paper into the printer to establish the appropriate top and bottom margins. As with the placement for the right and left margins, vertical paper positioning must be coordinated with the page format you use when writing the document. The guide may take the form of a small chart that you tape to the top of the printer or keep nearby. For example, the chart might tell you to line up the top of one type of stationery with the printer's ribbon holder and to roll up letterhead until 1/2 inch of paper shows above the ribbon holder.

If you do not use a tractor mechanism, be sure to align the box of continuous-form paper directly below the paper's path into the printer. This method will help keep the paper from sliding to one side during long printing jobs. You'll have the fewest problems and unexpected results if you establish standard formats for your routine work and make both a disk file and a printout of those formats. You can keep the printout near your keyboard and copies of the disk file on the various program disks you use, so that you can easily check to see what formatting instructions to include in a file before printing.

If you abandon a printing job before it

is completed, check to see whether the printer has stayed at the same spot on the page or automatically moved the paper to the top of a new page. If your printer or software doesn't automatically perform this top-of-page function when you stop printing in the middle of a document, be sure to roll the paper to the top of a new page before printing the next job.

Some printers will occasionally deposit a stray letter at the top of a page when they are turned on or off. If your printer has a tendency to do this, always turn the machine on before inserting special paper, such as stationery, that will be rendered useless by an unwanted character in an unexpected place. The best way to follow the foregoing hints is to experiment with the paper placement and print formatting options at your disposal. When establishing the standard formats you plan to use, create several versions of a letter, manuscript page, and other common documents, and choose the one or two versions that you find most pleasing and professional looking.

If you have seen the results of most formatting options and have given yourself clear instructions for positioning paper in the printer, you will be able to predict your printing results.

— J.J.H.



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some users also have. (Of course, that port is needed for the modem, so a user who has both a modem and a serial printer can use only one device at a time.) The parallel port doesn't have to serve such a dual purpose, so many early PC owners purchased LQPs that utilized the parallel interface.

The other original hardware in ques-

IF THE FASTER machine does not have a proven record of reliability and accessible service when compared with the slower model, it may not be the better buy.

tion was the cable used to connect the printer and the PC. Although salespeople and advertisements often claim that these connectors are "standard" or "universal" or otherwise simple to plug in and operate, in practice the cables and plugs required vary among different brands of equipment. Dealers and technical whizzes were able to find the correct cables (or modify existing ones); IBM sells only one parallel printer cable for the PC.

Because the initial configuration of the PC assumed a parallel printer (the Epson dot matrix), the original PC-DOS (version 1.0) provided for this type of printer interface. Users who had serial printers had to add special software routines to imitate parallel connections before their printers would function with the DOS. Now that PC-DOS 1.10 has replaced the original, users have an easier time installing a serial printer because they can select either serial or parallel as the mode for the printer (called LPT1 in DOS), and they can set such parameters as baud rate, parity, and stop bit for that port. This mode statement can be made part of the AUTOEXEC.BAT file that loads automatically.

The other operating systems available for the PC—CP/M-80 (which requires a special conversion board containing an-

other CPU) and CP/M-86—also can be configured to work with either a serial or parallel printer. So far, however, PC-DOS is the most widely used operating system.

Once the DOS is communicating with the printer, there may be problems with various applications programs. Many program designers rushed to ready their products for the PC, and they often provided only rudimentary installation routines for a printer or assumed that the Epson would be the printer in use. The more sophisticated a program's printing features, the more detailed its operating and installation instructions must be. Enterprising users or responsive program producers have solved at least some of these printer-interface problems, but not all program features will work with all LQPs.

Printer manufacturers have not established standard codes for special printing functions such as microspacing or bold face type. There are presently three major "protocols" for LQPs, each associated with one of the three most widely used brands of these printers—Diablo, Qume, and NEC. Most other manufacturers of LQPs adopt codes that are compatible with one of these three, but some low-cost printers or converted typewriters may not be entirely compatible with the protocols. Because most software producers base their printer-installation routines and instructions on one or more of these codes, a printer that cannot accept any of them may not be able to perform many of the special operations provided in the software.

PC users had to find their own answers to many of the printer-interface questions forming user groups and electronic bulletin boards such as The Source at CompuServe to provide whatever information was available. These organizations are good places to ask questions and share solutions to hardware or software problems. In addition, User-to-User reports precisely this kind of information.

In response to the initial problems with interfacing serial printers to the PC, some software producers have offered programs to help with printer installation. The documentation for one such program, SerPrintSoft from International Computers, claims that it allows users to change default settings relating to the serial port and prevents lost characters or buffer overflow when using DOS 1.0 or 1.10. Another component of this program provides instructions for building cables to connect

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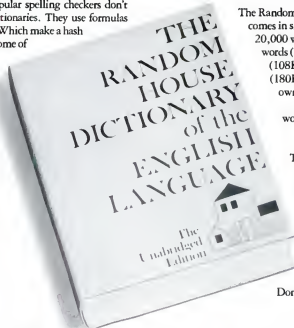
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AEGIS SYSTEMS

several popular LQPs with the PC.

Intelligent Printers

Sellum is one distributor of letter quality printers that adds some additional electronics to them to increase both features

CONVERSION mechanisms offer low-budget alternatives for professional-style printing, but they can also cause more wear on a typewriter than conventional use.

and compatibility with the PC. Sellum offers three specially enhanced LQPs: two of them are NEC machines (the 3500 series and the 7700 series) and the third is the Fujitsu. Each machine contains both serial and parallel ports as well as special instruction sets that emulate the printing codes of other popular brands of printers. Other of these enhancements make it easier for users to interface the printer with the PC and to utilize the printing commands and features of applications programs.

The Sellum printers include a 16K buffer, which holds the equivalent of ten pages of double-spaced text. (The standard printer buffer is much smaller, usually 256 characters.) The large buffer can allow printing to continue while the computer is working on another task, and it prevents the delays or lost data that can occur when a small buffer overflows. Several other manufacturers offer separate printer buffers, either as external units or as boards that may be installed in the printer or computer.

Choosing an LQP

You can begin to assess your own requirements for a printer. Consider the following criteria when choosing an LQP.

- The tasks your printer must perform: before you can choose hardware or software effectively, you should have a clear

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idea of the jobs for which you will use the computer system. If you already have a computer and are adding or replacing a printer, you probably know why you need this equipment. But you should also try to calculate the volume of printing the LQP will be doing, as well as any special printing features needed for your work. Determine whether a low-cost model or a more sophisticated and higher-priced machine is appropriate.

• **The interface/compatibility factor:** Obviously any LQP you consider should be capable of working compatibly with the PC. Before purchasing one, you should see it in operation. If you plan to use the printer with complex programs, such as a word processor, it would be wise to see a demonstration of the printer and the program in action together.

One way to minimize any interfacing problems is to purchase the entire system, including an LQP, from one dealer and to get that dealer's assurance that the printer will function properly with the programs you intend to use. You may not want to buy

everything in one place, however, or you may choose a printer not sold by an IBM dealer; in this instance, try to get the printer dealer's guarantee that the machine can

WHATEVER
the advertised speed
of an LQP, the real
issue is the machine's
production of printed
pages.

be interfaced to the PC or that you can return the machine if it is not satisfactory. If the prospective printer dealer is in your local area, you might even insist that you be allowed to bring in your PC for a working demonstration of the printer with your hardware and software before buying.

• **Speed:** Once you've narrowed your search to LQPs that will interface with the PC and you know the jobs for which you will be using the printer, speed should be the next criterion. If possible, compare actual printing speeds rather than advertised results. A performance test will help narrow the field of candidates, but don't make the final choice based on speed alone.

• **Reliability and service:** Before settling on one printer, investigate the reliability and frequency of service of several models that provide the speed and features your work requires. For example, if you are considering three different LQPs that have similar speed and price ranges, the deciding factor could be the frequency of breakdown or percentage of down time for each one. Although this information is not widely published, you can get a reasonable idea of various machines' reliability by asking the technicians at the dealer where you shop, polling everyone you know who uses an LQP, and even phoning the offices of printer manufacturers.

Find out the manufacturers' service

User Guide to Printers

A baker's dozen LQPs to interface with your IBM PCs.

This guide is for PC users and prospective owners who want to add letter quality printers to their systems. Each of these LQPs has been successfully interfaced with the PC. In addition to the chart, three PC owners have contributed mini reviews of their own printers.

NEC 3550

Ads for the NEC 3550 state that this printer and the PC were "made for each other." With high hopes, I plugged a 3550 into my PC's parallel port (on the monochrome display adapter/printer card).

The 3550 differs from other Spinwriters in that the dominant top cover is supposed to match the recessive, putty-colored surfaces of the PC's cabinet. Unfortunately, the NEC paint mixer put too much green in the batch, so the matching effect is lost.

The other apparent difference is the control panel, which on the 3550 has a minimum of switches and push buttons. All machine fault signals are directed to one flashing light; you have to inspect the printer to see the problem. Other Spin-

NEC 3550
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writers have a warning light for each.

Getting the 3550 going with EasyWriter 1.0 required reconfiguring program disks. I played with printer options to see if Type 2 ("Spinwriter type printer") or others would work. Some did, but with erratic results. The IBM Printer option seemed to work best.

My first try at printing a document revealed a well-hidden feature of the 3550: a 2K buffer. While the buffer is handy in dumping a Print Screen into the buffer

while you go on to your next task, it's a nuisance if you want to stop or pause printing. The signal from the keyboard is at the end of the buffer, and the printer continues for 2,000 bytes until the buffer empties.

I prefer instantaneous control over printing, so I wanted to disengage the buffer. I searched through the documentation and came upon a chart of three DIP switches. This is the only place in the IBM binder-size manual that mentions the ex-

(continued on page 170)

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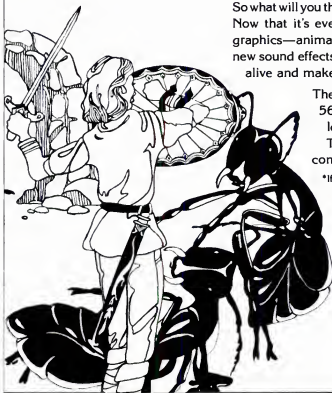
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[continued from page 168]

istence of the buffer. The trick, however, was how to get to the switches, which are buried well inside the printer in a hard-to-reach spot on the main circuit board. Why have switches if you have to take the whole printer apart to get to them?

The only other problem I am still having is making the 3550 print bidirectionally and perform special modes while double-spacing. For single spacing the printer performs special modes such as shadow printing and underscoring.

The overall print quality of the 3550 is very professional. About the only things it won't do for EasyWriter 1.0 are super- and subscripts even though the printer is capable of these tricks.

If the PC and 3550 were "made for each other," their relationship may be in for some rocky times amid the vagaries of new software coming down the line.

—Donny Goodman

I BECAME the first on my block to plug a 3550 into my trusty PC's parallel port.

UltraSonic/SuperCord

Computer technology has found its way into the typewriter market. Companies including Adler, Royal, Brother, Olympia, Olivetti, and Smith-Corona, are making typewriters that use electronic switching and daisy wheel printheads. Earlier electric typewriters use electro-mechanical switches and printheads. A by-product of this technology is a typewriter-computer printer combination. The machines are rarely sold as computer printers, but companies have developed interfaces that allow the typewriters to moonlight as computer printers.

The Smith-Corona UltraSonic is one of the least expensive of the computer-compatible electronic typewriters. The typewriter retails for \$579, but to be used as a printer it requires the SuperCord Interface (\$395). Albany Typewriter and Computer sells the UltraSonic with the SuperCord installed for \$795 (walk-in or mail-order).

As a typewriter the UltraSonic has programmable tab and margin settings, a 10-character corrector memory (using lift-off tape) and an express backspace. It comes with a molded carrying case and is billed as an electronic portable typewriter.

Snap-in ribbons are available in carbon film, correctable, and reusable nylon, and ten interchangeable daisy wheels are available. Unlike more expensive dual-pitch machines, the UltraSonic comes with either pica or elite type, but not both.

If you don't buy the system with the SuperCord installed, you will have to lift off the rubber platen to expose a chip on the machine's electronics board. You pull out the chip, plug one end of the SuperCord into the chip's socket, and reinstall the chip on the back of the SuperCord's plug. This takes about a half-hour, and you have to be careful not to damage the chip.

The UltraSonic/SuperCord system works. I used it to list some programs and to print WordStar and Volkswriter files. It printed the files beautifully, but would not support any of WordStar's special features, such as underlining, double-strike, or sub- or superscripting. I didn't expect the UltraSonic to perform sub- or superscripting (that requires a relatively advanced feature), but I had hoped that it could implement WordStar's simple method for underlining and double-striking. WordStar implements double-strike (a similar effect to boldface) by overstriking the characters when it reaches the material to be emphasized.

I had seen a demonstration in which the UltraSonic/SuperCord produced these effects using WordStar on an Osborne portable computer, but that required a special software patch, provided with the Osborne version of the SuperCord. The SuperCord people report that they are working on a similar patch for the IBM WordStar.

The major drawback to this and all typewriter-printer combinations is the slow printing speed. Using a program developed by PC to test "throughput," I found that it took 7 minutes, 16 seconds to print 50 lines of text (each line 70 characters long). See "The PC Speed Test for Printers," for the results from the same test of other printers.

Although the UltraSonic should be capable of typing thousands of pages without breaking down, one wonders about the constant pounding and extra speed of

[continued on page 172]


policies and procedures before purchasing a printer. Most manufacturers offer 90-day warranty on both parts and labor as well as extended warranties and service contracts. It's also good to know whether your dealer will repair the machine (during and after the warranty period) or send

IF YOU CAN
stretch your budget at
all, it would be wise to
buy a printer that is
faster than you
presently think you'll
ever need.

it to an out-of-town service facility. In some instances, the manufacturer specifies that printer repairs must be done at such facilities, which could mean a long delay in getting the printer back to work even if you don't have to pay for parts, labor, or freight. You may be able to arrange with the dealer to use a substitute printer (perhaps on his premises) if you have work that can't wait; consider writing such a provision into a service contract.

- Special printing features: Although such features as microspacing and justification may be highly desirable for your printing jobs, they are less important than having a printer that interfaces easily with your computer and software, and the functions reliably. If you are considering LQPs that have special features, however, try to arrange a demonstration of them with both the PC and the programs you plan to use.

- Price: Often price is the first concern in a major purchase such as an LQP, but it shouldn't force you to compromise on the performance that you require to do business. The prices of most LQPs fit into one of two categories—the \$750 to \$1,200 range and the \$1,900 to \$3,600 range. Your overall budget limitations will probably dictate from which of these categories you select, but your choice within that range should take into account the preceding criteria as well as price. You may find a 35 cps printer attractive because it costs \$400 less than a



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(continued from page 170)

computer printing. I raised this question with a representative of Smith-Corona, who said that the UltraSonic is neither designed nor warranted for such use. However, he knows of very few problems stemming from the machine's use as a printer. He also mentioned that the UltraSonic is mechanically and electronically similar to the Smith Corona TP-1 printer.

If you expect to use your letter quality printer frequently, this is not the machine to buy. You are likely to be frustrated by its slow speed and disappointed by its spartan features. You're also likely to wear out the typewriter prematurely. On the other hand, if you have an occasional need for letter quality and are willing to wait 3 to 5 minutes for the machine to print out a one-page business letter, then this could be your low-cost and versatile alternative. You will enjoy letter-perfect copy and a portable electronic typewriter for less than the cost of a letter quality printer.

— Lawrence J. Mogid

ComRiter

I wanted a letter quality printer that could handle routine professional and personal correspondence, moderately lengthy reports, and other word processing applications. Budgetary considerations were important, and I was willing to trade printing speed for a considerable savings in total dollars spent.

I purchased a Comrex CR-1C ComRiter, a printer manufactured in Japan (and identical in every way but the front panel name to the Brother HR-1). It is an operationally simple, microprocessor-controlled impact printer that uses daisy wheel technology.

The ComRiter produces copy identical to an electric typewriter's at a rate of about 200 wpm or 16 cps (Shannon test, pica pitch). It can use a parallel interface and be cabled directly to the IBM PC printer port using the standard IBM printer cable. In this fashion it operates as a system printer and is able to respond to the IBM Print-Screen key. Printing is bidirectional, and the machine can handle paper up to 16.5 inches wide. It appears to be sturdy and runs reasonably quietly because the printing noise is muffled by an effective acoustic cover.

Conveniently located on the front panel is a line spacing switch that offers single-, double-, or 1½ spacing, just beneath

this is a switch for selecting three alternative pitches: pica (10 pitch, 132 characters per line), elita (12 pitch, 158 characters per line), or 15 pitch (198 characters per line). This is a feature that one does not expect to find on a letter quality printer in this price category.

The power switch is placed on the left side of the printer where it is easily accessible but not likely to be accidentally switched off. A red light on the front panel and a high-frequency tone function as an alarm to indicate when more paper should be added or when a new ribbon is needed.

Paper loads smoothly and either single-sheet or continuous-feed paper can be used. One feature that is noticeably lacking is a tractor feed to maintain correct tracking of continuous-feed paper; this renders the printer incapable of doing a large volume of unattended work. Even without a tractor feed the printer does surprisingly well. Because the paper fits snugly against the platen, there is minimal slippage in printing the first six to eight pages of copy.

I have used the printer with a variety of programs, including VisiCalc, WordStar, and Volkswriter, WordStor, with its wide range of features, provides an excellent test for any printer. The ComRiter is able to follow most WordStar commands, including underline and boldface, but it does not take advantage of the WordStar microspacing feature, nor can it print subscript or superscript. Like other daisy wheel printers, this machine lacks graphics capabilities.

Both the ribbon and the daisy wheel may be changed with minimal fuss, as they are in self-contained cassettes. The daisy wheel cassettes provide a wide range of character style and pitch possibilities. The Comrex uses IBM Selectric type ribbon cassettes, making replacements easily obtainable.

Overall, the ComRiter is an easy-to-use, straightforward printer that provides an economical way to get quality copy. It is not a speed demon, nor does it support every feature one might require, but it costs half the price of a printer in that category. This printer could not be the workhorse of an office with high-volume word processing needs, but for lighter office or home use it is a good choice. It puts letter quality printing into an affordable price range and makes an ideal companion to an IBM PC.

— Stuart R. Schwartz

similar 32 cps model, for example, but the faster machine does not have a proven record of reliability and service when compared with the slower model, the faster printer may not be the better buy.

If you've read the advertisements

***THE MORE
sophisticated a
program's printing
features, the more
detailed its operating
and installation
instructions must be.***

even one issue of a computer magazine, you know that mail-order suppliers sell printers at a considerable discount off the typical prices charged by walk-in dealers. Because of the special needs of interfacing LQPs to the PC and its software, as well as the availability of service, however, weigh the savings involved against the potential for frustration, lost time, and extra service costs that could result from buying a machine without knowing the dealer. In certain instances a mail-order purchase may be your only way to afford an LQP with the speed and features you need, but be sure to find out the warranty and service procedures in advance, and check with other computer users to determine which mail order dealers are most dependable. (This advice also applies to walk-in dealers; just because you pay the full price doesn't guarantee good support and service.)

• Ask around: Ask everyone you know in the computing world about specific makes and models of printers, local dealers and mail-order suppliers, and any problems or issues specific to the PC and printers. You're likely to get a Pandora's box of replies, but some of the feedback could alert you to good and bad suppliers or equipment. If you find that a number of users agree on certain facts, such as one printer's reliability or another machine's balkiness, your poll will have been an effective tool. When you match this knowledge with your own research and criteria for your final selection of a letter quality printer should be simple. /PC

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The sculpturally stylish keyboard of the 486 Personal Computer is like a dream or guy you fall for at first sight. When a relationship ensues, you may find the dream image marred by flaws that cannot be seen in the cruel light of daily intimacy. The PC's keyboard is all sleek curves, a thin profile dressed in fashionable shades. The build is solid, and the keys move and respond to your fingers like a good dancer. So it is disillusioning when you

get familiar enough to discover that the left shift key is in the wrong place. Further familiarity brings more of the same. The keyboard design has a discouraging number of pickable nits.

Eighty-three keys on the slender panel connect via a coiled cord to the PC's main cabinet. Their names are a mix of those commonly seen on typewriters and those found on computers only. Some, like the group of ten changeable-purpose keys at

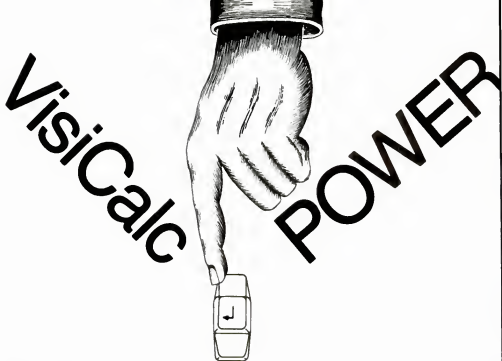
the far left, are a sort found on newer computer keyboards only. A few of the key names seem invented for this machine.

One shortcoming crops up with the three lock keys—NumLock, ScrollLock, and CapsLock. There is no visual or tactile indication of whether any of the locks are on or off. (The Ctrl-PrtSc key combination, which could be called PrintLock, has a similar problem.) The frequent result is typing numbers when cursor motion is in-

The PC's Keys

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ended, or vice versa, and similar annoyances with the other locks. More mail has been addressed to PC's Wish List column on this topic than on any other. Ironically, the fault is a by-product of an IBM design strategy intended to give programmers maximum flexibility with the keys.

The keyboard sends the computer no information other than that a given key (identified by number according to its position on the board) has been pressed or released. All interpretations of what the key means—whether it is a capital "A," an arrow, or a command to delete—are done by software at the computer's end of the coil cord, and programmers can change this software if they wish. Even the shift key and its cousins, Ctrl and Alt, do no actual shifting. The software calculates that if the shift key has been pressed but not released when the "A" key is pressed, then capital "A" is what's wanted (assuming the CapsLock key has been pressed

market and released at about the same time as the PC. Its arrangement of more than 100 keys includes both a cursor group and a number group, yet it seems hardly more complex than the PC's 83-key setup.

Perhaps the appearance of complexity could have been reduced if there were two key groups on the right—one for numbers and one for the cursor—separated by a band of space like that used to separate the function keys on the left.

Other nits about the number keys include the awkward leftward offset of the zero key, the lack of a double-zero, the lack of a divide key to go with the plus and minus keys, and the disguise of the multiply key, which is camouflaged by both its position and nonstandard legend. (It uses the programmer's "*" symbol for multiplication, rather than the adding machine's customary "x" symbol.)

Symbolic Legends

Many function keys are marked with international-type graphic symbols instead of plain words. Shift keys, for example, are

identified by fat, upward-pointing arrows. The symbols are nonintuitive, particularly the one for the tab key, and demand unnecessary thought to sort them out. Lack of a labeled return or enter key causes instruction manual writers to complain.

Another confusion arises with the delete/backspace key and the cursor-left key; they have nearly the same picture but significantly different functions. Since some keys have printed names or abbreviations instead of symbols, the partial use of symbols seems to have more to do with trendy appearance than functionality.

Key Arrangements

While other manufacturers of new personal computers are slavishly imitating the keyboard standard IBM set with its Selectric typewriter, IBM itself is moving away from it. Not only is one shift key awkwardly far left, but both are small, while the seldom-used Alt key is a huge target. The enter key is far more difficult to hit on a PC than the equivalent return key on a Selectric. The extra characters of the computer

THE ENTER
key is far more
difficult to hit on a PC
than the equivalent
return key on a
Selectric.

and released an even number of times since the computer was last restarted). Software control of the lock keys makes providing a physical indication of their status more difficult, though not impossible. Hopefully, someone will devise a solution soon.

Numeric Keypad

Most probably, IBM kept down the number of PC keys to avoid scaring those who are intimidated by complex-looking machinery. But the double-duty arrangement that has the right-hand group of keys serving for both number entry and cursor control was a false economy. Spreadsheet program users who have frequent need for both types of keys groan loudly over the need to switch key functions back and forth. For comparison, consider the Victor computer, a product aimed at a similar

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character set, such as the backslash and vertical bar, seem randomly located.

Many critics have noted that IBM might better have arranged the function keys in one horizontal row to match video labels across the bottom of the screen. Assuming IBM had a good reason for having them in vertical rows, it still might have

THE IBM'S click sounds nice.

been better to number the keys in two rows from top to bottom—F1 to F5 on the left and F6 to F10 on the right. With the current arrangement, F4 through F8 seem difficult to locate without deliberately searching for them.

The ScrollLock key is placed as if it would reverse the effect of NumLock, but it does not. As a matter of fact, ScrollLock

has no present use; it has been provided for future use by programmers who want to make screenfuls of data scroll up, down, or sideways when the arrow keys are pressed while ScrollLock is in effect.

Physical Details

IBM provided retractable legs on the bottom of the keyboard to adjust its angle. Only two adjustments of the legs are usable, however—up and down. A wider range would have been preferable.

One prized feature in keyboard design is key click, a physical feedback that reassures the user a key has been pressed successfully. The IBM's click sounds nice but could provide more physical feedback to the fingers. Another frustration is caused by IBM's use of an unusual, spring-loaded key design to provide key click. The keycaps are not replaceable by industry-standard keycaps.

Serious Omissions

One troublesome omission is a typewriter-style shift lock, one that is released

by the next press of the shift key. For one used to typewriters, the absence is pain, and the CapsLock key is no substitute. One is tempted to speculate that the along with the awkward shift and enter keys, is part of a deliberate IBM strategy to discourage consideration of the comparatively inexpensive PC for serious word processing use.

Perhaps the most galling omission of all is the lack of a true reset key. The three-key combination Ctrl-Alt-Del will cause immediate cutoff of whatever program in progress and restart the computer as if were freshly turned on. More desirable is a true reset that simply breaks the computer out of a running program and places it in a holding loop for further instructions without destroying whatever may be in memory. Since the PC reset is actually a software function, the Ctrl-Alt-Del combination will not work if a program gets hung up at some stage at which the PC is not listening to keyboard input, such as during disk access. In such cases the only workable alternative is to turn the power off.

A true reset key would reset the computer while running a BASIC program then issue further commands to return to BASIC without reloading it from disk. The omission of a reset key may have been a deliberate choice to frustrate unauthorized copying or examination of commercial software. Using Ctrl-Alt-Del, if you stop operation of a program, you also automatically wipe it out of memory. This would be a good idea if it encouraged the appearance of more and better software. But many of those given to hard-core software theft have the technical know-how to connect their own reset key. Less knowledgeable users are stuck with wiping out their data whenever some glitch leaves their program lost in never-never land.

Software authors suffer the most. Programs are prone to getting hung up in endless loops during the development phase and they are forced to choose between a design that makes them work harder or dubious surgery on their machine.

In a recent speech to an industry gathering, chief IBM scientist Lewis Branscomb said the PC's keyboard will become one of IBM's standard keyboards. It is already being used with different key definitions on IBM's Datamaster computer. Before standardizing it, IBM would be well advised to make the keyboard live up to its good looks.



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CP/M-86

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Now that you have your IBM Personal Computer, which of the available operating systems should you run on it? The answer to this question depends on what you do with your PC: Are you a nontechnical user, an applications programmer, or a sys-

tems programmer? Each type of user has a different set of priorities to consider in selecting the optimum operating system.

If you are like most PC owners, you use your computer to run off-the-shelf applications programs such as word processing, spreadsheet, and communications packages. You may question the need for buying another operating system: Isn't the one supplied by IBM adequate for general use? The answer is a qualified yes; but due to the complex trade-offs among the various operating systems available for the PC, it pays to examine the factors involved before deciding whether to buy another operating system.

This article compares Microsoft's MS-DOS with the CP/M family of operating systems from Digital Research. The nature of operating systems makes this discussion technical. The nontechnical reader may want to skim the following analysis and

read the sidebar and conclusion for an overview of the survey results.

CP/M-86

CP/M was invented in 1973 by Gary Kildall, the founder of Digital Research. At that time he was a software consultant for Intel Corporation. Intel wasn't interested in his fledgling operating system, so he took it to the microcomputer hobbyist groups that were then springing up in Silicon Valley. As a result of their interest and support, by 1975 a number of pioneering micro companies such as MITS and IMSAI were offering CP/M as their standard (and only) operating system. Powerful software development tools such as Microsoft BASIC became available soon afterward, and CP/M really began to take off. In sheer number of applications programs, compatible machines, and installations, CP/M-80, the direct 8-bit ancestor of

CP/M-86, is probably the most widely used microcomputer operating system in the world.

CP/M-86, the 16-bit version of CP/M, is a single-user, single-tasking operating system. It supports one operator console and runs only one program, or task, at a time.

The memory management features of CP/M-86 are superior to those of MS-DOS. Whereas the memory regions in MS-DOS can become "fragmented," or divided among many small programs, CP/M-86 allocates memory according to the size of the program. This insures that a program will always be able to load if there is enough unallocated space in RAM. With MS-DOS, fragmentation can prevent a large program from loading.

Program locking, stacking, and chaining are easier to implement under CP/M-86 than under MS-DOS, mainly because of the better uniformity and increased flexibility of CP/M-86's memory management software commands. Programs can be locked into memory so that they can be used by other transient programs to perform functions without being deleted when their task is finished. This feature is handy for implementing a background utility program such as a printer spooler. The user can load the printer spooler, load other software on top of it, and then call the spooler to output files to the printer while doing other tasks.

Programs running under CP/M-86 may load and execute other programs under their control (program stacking) as well as manage the available memory in the system at will. An example of the use of this feature is the dynamic debugging tool program, DDT-86, which loads and runs programs under its control so that they can be debugged. For example, to debug an assembly language program, the user would type `DDT86`. The DDT program will load and then prompt for a command. At this point the user can tell it to load the assembly language file. He or she can then look at selected memory locations, execute the program step by step, or modify its sequence of instructions.

In program chaining, a program that has finished its task can issue a command to load and run another program residing on disk. An example of this is an initialization routine that customizes a word processor to a particular system's hardware.

After altering the word processor, the initialization routine starts the word processor and then terminates itself.

Program locking, stacking, and chaining are necessary features for the operation of complex software systems. CP/M facilitates program chaining with an operating system call, whereas in MS-DOS, applications programs have to carry out chaining themselves. This makes the development of software under MS-DOS more complex. Easier implementation of these functions under CP/M-86 means that applications programmers will be more inclined to write software for CP/M-86 than for MS-DOS.

The design of the CP/M-86 disk operating system is based on the assumption that users have disk hardware with a 128-byte data sector. Any deviation from this size requires that the system programmer write extensive blocking/deblocking routines into the input/output system. These routines adjust the way data is handled by CP/M-86 to the hardware sector size used by a specific computer. The lengthy calculations involved in these routines decrease disk performance. CP/M-86 has to read

THE SIMPLER applications will probably flourish in the MS-DOS environment, while sophisticated packages will probably be written for CP/M.

disk space allocation information from the disk directory each time the disk is accessed, a process that further degrades performance. However, as CP/M checks the space only at the beginning of a read or write, the performance difference between CP/M-86 and MS-DOS is proportionately less for long files. There is no appreciable difference in speed between the two systems when using a hard disk.

However, CP/M-86 is significantly slower than MS-DOS on floppy-based systems.

CP/M-86 is less efficient in its use of disk space than MS-DOS because it allocates disk space in blocks of 2K regardless of the actual amount of data. CP/M-86 serves the first two tracks of a diskette with operating system software, whether or not a system disk is being used. These inefficient practices mean that MS-DOS stores more data than CP/M-86 on the same size diskette.

The greatest difference between MS-DOS and CP/M-86 is in error handling. CP/M-86's handling of physical disk errors leaves a great deal to be desired; there is no provision for recovery from errors. All you get is a cryptic error message, such as "BDOS ERR ON A: BAD SECTOR". If the system hangs, and you have to reset the system and restart your program, the error should be corrected in later versions of CP/M. One advantage is that up to 16 numbers can be assigned to files in the CP/M-86 directory, easing the implementation of complex file systems.

An area in which CP/M-86 unequivocally outshines MS-DOS is in its I/O device handling. The CP/M-86 `STAT` program provides a convenient way to change device assignments. When a letter qu serial-interface printer and a high-speed parallel-interface line printer are used, both printers can remain connected to their respective interface connectors. When change printers, the user types a command such as `STAT LST:=LPT<CR>`, and the operating system automatically sends printer output data to the new device. Applications programs have access to the same facility, but more directly through operating system function calls. The neither of these methods is very clear to the novice CP/M user, careful reading of the documentation will reveal the intricacies required to do the trick.

Another CP/M advantage is the sophistication of its file transfer program, Peripheral Interchange Program (PIP). PIP not only transfers files from any part of the system to any other, but also performs a wide variety of useful functions. PIP displays the contents of the file on the terminal as it is being transferred, filter out feeds, translate uppercase character lowercase or vice versa, add line numbers to the destination file, concatenate or expand tabs to any number of spaces,

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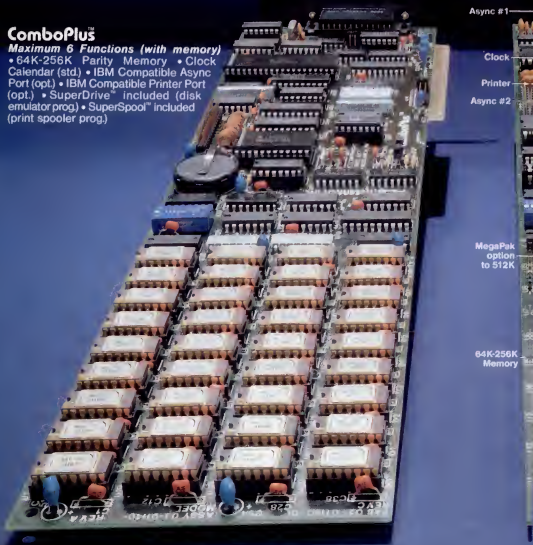
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destination file's correctness, and validate parity bits. Many of PIP's features appeal to the programmer or systems administrator; certain situations make these options invaluable. For example, when sending WordStar files (which use a parity bit to indicate various word processing functions) to printers (which do not work properly with the parity bit), PIP suppress the offending bit with ease. It takes longer than MS-DOS's Copy command, but it does more.

Digital Research deserves credit for improving its documentation. When Gary Kildall developed the first version of CP/M, he probably never dreamed that technical types would use it. CP/M's original documentation was written for a computer professional. The typical PC user would find it incomprehensible. While the User's Guide and other documentation supplied with CP/M-86 are the best I have seen, they are certainly better than former CP/M-80 books. The documentation is at least as good as Micro-Soft's and improving rapidly.

Current CP/M-86

The disk performance of Concurrent CP/M-86 (CCPM-86) falls short of that of MS-DOS, but it is faster than CP/M-86. File handling and the user interface have been improved, but they are not up to the user-friendliness of MS-DOS 2.0. CCP/M-86's multitasking capabilities really seem to set it apart from the others. That and the ease of access to sophisticated operating system functions make CCP/M-86 an attractive system for the state-of-the-art software developer. For further details on CCP/M-86 see "Current CP/M-86" (PC, October

1982), which provides sales and technical support and other services to MS-DOS users, also markets the system as SB-86.

The user interface, or shell, of MS-DOS 1.2 is strongly reminiscent of CP/M-80. An ambiguous A> prompt appears on the left side of the screen, and the user must type commands in cryptic computer jargon in order to do anything. The only

ENSURING upward compatibility is a vital issue for hardware and software developers, and computer users at all levels.

help available are a primitive line editor and a thick manual.

Fortunately, Microsoft is giving the MS-DOS 2.0 user interface an extensive face lift. The traditional command-line-oriented shell is there along with a slick, new, menu-driven command input screen. The user selects a command by positioning the cursor next to it with the space bar and pressing Enter. There are windows for the date and time and the current disk directory. Disk files can be selected by typing in a number from 1 and 0, eliminating the need to type in file names. A question mark invokes a context-sensitive Help feature. For example, if the cursor is next to the Copy command, the program will give help information relating to Copy.

The MS-DOS 2.0 shell is customizable; the user can create commands by specifying the meaning of the PC's function keys. Programmers can also customize the menus, commands, and error messages of the shell. MS-DOS 2.0 can be tailored to a particular application, foreign language, or personal preference. Most of the various system utilities display a consistent, menu-driven, customizable user interface, which makes the whole system easy to learn.

Another bonus is that the command shell and screens are similar to those used

in the XENIX shell. XENIX is a licensed version of UNIX, a popular minicomputer-based operating system originally developed by Bell Labs and adapted by Microsoft for the 16-bit microcomputer. MS-DOS 2.0 users will have no problem getting used to XENIX. As microcomputers become more powerful, they are going to start looking and acting more like minis. Ensuring upward compatibility is a vital issue for hardware and software developers, and computer users at all levels.

MS-DOS 1.2 supports the full 1 megabyte of memory space addressable by the PC's 8088 processor as long as the memory is contiguous. The range of addresses from lowest to highest must be unbroken; the user can't configure a memory expansion card to start at any address higher than the current top of RAM. MS-DOS 2.0, however, supports noncontiguous memory. Commonly used operating system command functions, such as Copy, Rename, Date, Type, Dir, and batch file processing, remain in memory at all times. Other commands are transient and are loaded from disk only when needed. This feature saves space for large programs when limited memory is available, as in the minimum PC system. The resident commands execute instantly.

Microsoft has streamlined the MS-DOS disk operating system. It is very fast. MS-DOS theoretically can handle disk files up to 1 gigabyte (1 billion bytes). User programs are completely shielded from hardware characteristics. As a result, a program does not have to read from or write to the disk in 128-byte blocks; instead it performs read/write operations of any size randomly in the file. MS-DOS keeps complete disk file information in RAM at all times; it does not need to read the disk directory each time a read or write is performed. Even with multisector operations, the disk hardware can operate at its maximum speed.

Disk operation under MS-DOS 2.0 is further enhanced through the use of multiple disk buffers, or "caches," holding two or more complete tracks of data. Applications can access multiple sectors of data without further disk reads. When more data is needed from the disk, the operating system writes the oldest buffer back to the disk, unless the data in the buffer has not been altered. If this is the case, the old data is simply overwritten by the new buffer.

MS-DOS 1.2 and 2.0

Microsoft's MS-DOS, like CP/M-86, is a single-user, single-tasking operating system. In fact, it is so much like CP/M-86 that this discussion needs only to highlight differences between them. It runs efficiently in as little as 32K of RAM and handles up to 50 megabytes of disk memory. Microsoft developed the first MS-DOS, a product called 86-DOS. Seattle Computer Products (SCP) sold the rights to the system to Microsoft. After adding improvements, Microsoft released it to the public in July 1981 as PC-DOS. Lifeboat As-

Virtual disks residing in RAM are also part of the MS-DOS 2.0 enhancements. The resulting speed increase can dramatically shorten the time required to compile programs or use a large program with frequently accessed overlays. The user must install a memory expansion board, such as the Microsoft RAMCard, in his or her PC to take full advantage of this feature.

MS-DOS, unlike CP/M-86, does not require that the user reset the disk system when changing disks. Disks may be changed at any time as long as a file is not being written. MS-DOS also keeps several backup copies of the disk allocation table so that in the event of a head crash or other error, disk file information cannot be lost. The FORMAT utility locks out bad disk sectors so the user will not lose data by accidentally writing to them. The combination of these features guarantees good data integrity in the disk system.

In MS-DOS, applications programs treat all peripheral I/O devices as if they were disk files. Only one set of functions is necessary to perform any kind of I/O. It is possible to change the input or output of data from one device to another without affecting the applications program.

However, changing the input or output from one device to another requires that the user make changes in the operating system; what's more, certain peripherals are not supported by Microsoft for the PC version. Why Microsoft chose to make this procedure so complex is a mystery. It requires getting into the operating system with a debugger, entering patches, and saving the result to disk. This type of complex work is attractive to only the compulsive computer hack; it seems out of place in a system ostensibly aimed at the unsophisticated user.

MS-DOS 2.0 loads and links device drivers dynamically when it is being booted. These drivers are the parts of the operating system that actually operate the system hardware. In MS-DOS 2.0 the user can add or change peripheral devices at any time without a major software overhaul since space for the drivers is allocated dynamically. This ability greatly simplifies upgrading a system to new hardware configurations.

MS-DOS 2.0's software interface for keyboard and screen operations can use the American National Standards Institute's (ANSI) escape sequences. An es-

cape sequence is a terminal command code using the ASCII escape character followed by other alphanumeric characters. Using standard sequences ensures better applications program transportability among similar machines. Matching the control codes used by different computers and terminals to their corresponding software functions can become a jungle of incompatibility for the software developer. By using the ANSI escape sequences, one set of software commands will interface with any terminal. The operating system intercepts these sequences and translates them, if necessary, into the host terminal's cursor movement and editing commands.

MS-DOS 2.0 supports the AT&T Presentation Level Protocol for text and graphics. Presentation Level Protocol provides a way of expressing graphics operations in strings of ASCII characters, instead of using a bit map of the individual pixels of the display device. With the Presentation Level Protocol, programs can access, use, and store graphics screens on

disk or send them to peripheral devices such as printers without considering the screen resolution or other hardware details. The Presentation Level Protocol enables MS-DOS to interface with a network or data base system that uses the same protocol with minimal additional code—a plus when using a PC with a commercial videotex or network installation.

MS-DOS 2.0 is upwardly compatible with XENIX in many areas. New calls perform identical I/O and dynamic memory management functions. Programs compiled on an MS-DOS 2.0 can run under XENIX, and vice versa. MS-DOS passes files to application programs in the standard XENIX format. "pipes" can send the output of one to the input of another.

These pipes are temporary disks. They are slow on an MS-DOS file-based system but fast in a hard-disk DOS or XENIX system. CCP/M-86 performs the same function using pipes which are much faster since they are

What Is an Operating System?

Understanding the manager's job.

During the early days of computing, engineers and experimenters had to toggle in their programs, setting every single bit by hand with switches or, at best, a crude keypad. To overcome the difficulty of getting increasingly large amounts of data into and out of computer systems, computer scientists developed the operating system. An operating system is a collection of programs that manages the flow and interaction of other programs and data through the various parts of a computer.

Most operating systems consist of three main parts: the supervisor, the software interface, and the hardware interface. The supervisor accepts commands from the operator, allocates system resources such as memory and I/O devices, and controls the execution of user programs. The software interface enables user software, such as applications programs, to access system functions and hardware, such as the display or printer, in a uniform and logical manner. The

Basic Input/Output System (BIOS) hardware interface controls the actual computer hardware. Many of the more sophisticated operating systems include their own text editors, compilers, and other software utilities.

Upon receiving a command from the user, the operating system supervises the requested file from the disk, accesses a resident utility routine ready in memory and starts it running. Programs written by the user have access to system resources through the software interface provided by the operating system. If the user's program needs to access peripheral hardware devices, the operating system BIOS takes care of the details of the data transfer.

Computer hardware is like the body and motor of a car, while the operating system is like the steering wheel and driver controls. The user's applications program is the driver, which tells the whole system what to do.

—D.B.

irely in RAM. Pipes can be used by a base utility to send mailing list information to a word processing program in order to merge-print form letters. XENIX utilities called filters are also available with MS-DOS 2.0. Applications programs can pipe these filters together to perform functions such as sorting and archiving without the applications programs having to contain these capabilities themselves. Another feature is the ability to invoke the command shell from inside a program, allowing a program to list the directory without having to duplicate the directory-listing function internally.

Microsoft is working on networking capability for MS-DOS in the form of an add-on enhancement software package containing a mail system, file transfer function, and other utilities. It will be compatible with both MS-DOS and UNIX, with the XENIX system serving as a hub for several MS-DOS users. The multitasking ability of XENIX enables it to handle simultaneous I/O requests from several network nodes and still act as a work station. Files will reside on hard disk in the XENIX system and be sent to and from work stations as required. The hub also acts as a switching and relaying center for messages and local-network electronic mail. Microsoft spokesman Chris Larson stresses, however, that the system has not been tested and that no release date has been planned.

An impressive and useful array of software development utilities is a standard feature of MS-DOS. A program that translates 8080 or Z80 code into 8086 source code, a linker, and a library routine come with a powerful assembler to give the programmer everything needed to take full advantage of the PC's 16-bit processor. The MS-DOS translation program allows the user to translate code developed under CP/M-80 or SB-80, Microsoft's 8-bit operating system, to MS-DOS 1.2 or 2.0. Some modification beyond simple translation may be necessary to get the programs run on 16-bit systems, so I suggest that this tool be used primarily by a technically trained user.

The linker routine allows the programmer to write and debug simple modules of complex software project separately and then combine them. Similarly, the library utility forms functions into libraries that can be called from any program. The pow-

erful 8086 assembler supplied with MS-DOS is the most interesting and exciting utility of all. The assembler syntax, unlike Digital Research's, is compatible with the Intel 8086 assembler, including data structures and bit fields. Data is typed strongly and, most importantly, there is a unique full macro facility including nested macro

C *P/M-80 IS probably the most widely used microcomputer operating system in the world.*

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instructions. SEGMENT and GROUP operators allow the user to consolidate routines at link time, enabling the routines to share segments while retaining local variable definitions.

The MS-DOS Debug utility does not have an on-line assembly function. Even if it appears that the bug has been located, there is no convenient way to patch the software to confirm the diagnosis. The user either has to enter the machine language opcodes by hand (not recommended) or go all the way back to the source code to include the changes. This lengthens the debug loop for assembly language programmers. However, in MS-DOS 2.0 the Debug utility should not have this shortcoming.

Error handling is one of MS-DOS's most mature features. The operating system traps disk errors and displays an error message in understandable English, giving the options RETRY, IGNORE, or ABORT. Applications programs running under MS-DOS can also trap these errors and handle them in whatever way is most consistent with the application, ensuring that the applications program is always in control of the system. For example, a word processing program that encounters a physical disk error could request that the user insert another disk or make room by deleting old files so work will not be destroyed. Error messages are thoughtfully

consistent across the whole family of MS-DOS utilities, making them very easy to learn. MS-DOS 2.0 also traps errors from serial I/O devices such as modems and printers. Instead of giving a rude error message when the user forgets to plug in the printer, the program pauses to give the same options described for disk errors.

MS-DOS is easy to install. Before an operating system can run on a new computer, system programmers have to adapt it to the idiosyncrasies of the hardware. Adaptation can become a problem, especially when no special features are designed into the operating system to ease the process of "porting" it to a new machine. Several systems programmers who had installed both CP/M-86 and MS-DOS 1.2 on new hardware systems unanimously voted MS-DOS easier to install, citing MS-DOS' better assembler and other utilities, its lack of a size limit on I/O system code, and the absence of any assumptions in MS-DOS as to the nature of the hardware the system will run on. MS-DOS 2.0, with its relocatable I/O driver modules, should be even easier to install.

The documentation supplied with MS-DOS is a typical daisy-wheel-printed, undistinguished compilation of dry computerese. It's published in a bulky ring binder, ensuring that after some use the pages will begin to fall out. Software suppliers should wake up to the fact that most of us are not programmers and that we require readable tutorials, quick-reference charts, and manuals that speak to our actual understanding and use of computers. IBM has set a professional standard for microcomputer user manuals, and PC users are accustomed to this quality.

Microsoft's customer support is perhaps its most serious shortcoming. Many MS-DOS users I interviewed complained that they could not get the kind of technical advice they expect from a large, successful company. When calling Microsoft to inquire how to interface a serial printer to the PC, one computerist wastold, "Don't expect any support for serial printers on the PC until IBM is selling one." According to a company marketing representative, "We don't provide any end-user support. IBM is our licensee and customer and we support them." Incidentally, Microsoft has promised a serial printer interface as well as a printer spooler utility for MS-DOS 2.0.

The sort of closemouthed attitude displayed by many Microsoft representatives stands in contrast to the open and helpful spirit in which the microcomputer revolution began. Microcomputer users want increased hardware and software compatibility. The software house that supports this need will come out ahead in the long run. By its insistence on being the "only official" operating system supplier for the IBM PC and its total lack of support for popular Digital Research products, Microsoft seems to be trying to corner the market

C *CP/M-86 is significantly slower than MS-DOS on floppy-based systems.*

on PC software. But it is in danger of painting itself into the opposite corner by failing to provide compatibility with other manufacturers' widely used products and by withholding the necessary information for third parties to patch their systems for special uses.

Evaluations and Conclusions

For the nontechnical user, comparing these operating systems may seem to be a study in abstruse technical trade-offs. Both MS-DOS 1.2 and CP/M-86 are virtual clones of CP/M-80, the widely known 8-bit operating system. However, both manufacturers are racing to add big-system features to their new releases in order to exploit the power of the PC's 6066 microprocessor. Unfortunately, this competition to implement a minicomputerlike system on the PC is making MS-DOS and CP/M more incompatible as they become more sophisticated.

This split increases the pressure to make a commitment to one system or the other. MS-DOS 1.2 is clearly the leader in ease of use, disk I/O speed, error recovery, and its assembly language compiler. However, CP/M-86 offers superior memory management, more flexible utilities, simpler I/O device redirection, and an easier upward-compatibility path to a multiuser or multitasking operating system.

The issue is complicated by the release of the new versions, MS-DOS 2.0 and CCP/M-86. MS-DOS 2.0 is clearly the winner in terms of user-friendliness, and it is available free to Microsoft MS-DOS licensees. (IBM will probably make MS-DOS 2.0 available to PC-DOS users at a nominal cost.) But the powerful multitasking features of CCP/M-86 are attractively convenient. And for users who already know the operator interface to either MS-DOS 1.2 or CP/M, CCP/M-86 is not any more difficult to use. Many microcomputer industry analysts think that within a couple of years, concurrency will be a mandatory feature on all professional micro systems. Full use of the 16-bit microcomputer's power is only possible under a concurrent operating system, be it single user or multiuser. And computer users will not settle for doing one thing at a time when they know they can do four.

For the technically oriented user the decision is no less difficult. Popular 8-bit software development languages such as CBASIC by Compiler Systems (now Digital Research) and Microsoft BASIC are available for one family of 16-bit operating systems or the other but not both. Large amounts of source code written in these languages for 8-bit computers will not run under both operating systems in the 16-bit world without costly and time-consuming translation of software packages.

Another factor is the forthcoming availability of Intel development languages under CP/M-86. This availability is contingent upon Intel releasing its Universal Development Interface for the system. At least one computer manufacturer already has this package up and running on a 16-bit micro. Future Digital Research software enhancements will provide networking compatibility across 8060, 8065-, 8066-, 8068-, and 80800-based micros.

The internal features of CP/M-86 and especially of CCP/M-86 make them more attractive to the applications programmer. But ease of use makes MS-DOS 2.0 the choice for the nontechnical user. Although MS-DOS' early entrance into the PC software race has so far given it a bigger share of the market, CP/M's long-range prospects are healthy. Authors of complex software packages are almost certain to pick CP/M because of its superior memory management, since MS-DOS often forces languages to perform like their 8-bit pre-

decessors. The simpler applications will probably flourish in the MS-DOS environment, while sophisticated packages will probably be written for CP/M.

An interesting observation in this era "upward migration" from 8- to 16-bit computers is that the full computing power the IBM PC has yet to become available to the average user of the machine. The reason for this lag is the simple fact that new hardware must be physically available before software development can begin. The path of upward migration leads ultimately to the "micro-mainframe," a 32-bit desktop computer with the performance of, say, an IBM 360. Although that goal is still several years away, it is interesting to note that the obstacle to its accomplishment is probably going to be software development lead time. Meanwhile, we can expect 16-bit software to go through several generations of improvement as software developers explore the performance potential of the new machines.

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The first generation of 16-bit computers was an expansion of 8-bit predecessors, and the first generation of software for the new 16-bit machines was translated from its 8-bit equivalent. Expedient was hardly the optimum solution. MS-DOS 1.2 and CP/M-86 are the first generation of 16-bit software systems, while MS-DOS 2.0 and CCP/M-86 represent the beginning of the second generation of true 16-bit operating systems. They are only beginning to use the inherent power of true 16-bit machines such as the IBM PC. /P/

David Hughes is a technical writing consultant to Digital Research Corporation at Pacific Grove, California, where he is writing the Concurrent CP/M user manual and system guide for the IBM PC.

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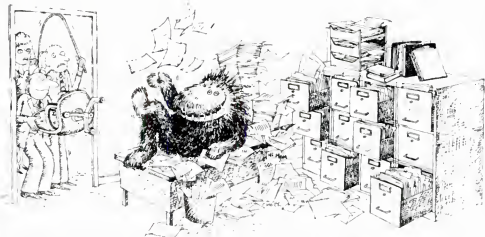
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Equipping Your IBM PC For Word Processing

Your word processing needs—from jotting down memos to writing a novel—should dictate how you outfit your PC. Software, memory requirements, disk drives, and printers are all considered.

When the ancient scrivener of the Great Pyramids sat down to commit his message to stone, he needed the proper chisel, the right rock, and an adequate hammer. If that same scribe were at work on a major project today, he'd find it easier to use a word processing computer for speed, convenience, and accuracy, and he'd be able to crank out extra copies at the push of a button.

But he'd still have to choose the right tools of the trade. What kind of computer? What sort of word processing software? How much memory? How many disk drives? What sort of monitor?

You're probably reading PC Magazine because you already own or are considering purchasing an IBM Personal Computer or a compatible system. Getting the right computer for your needs should be your first concern when setting up for word processing.

The IBM PC is a very capable machine that can become a first-class word proces-

sor. Unlike the Apple, which has to be modified and built up with lowercase adapters, 80-column display cards, and other devices, the PC itself is fully able when you take it out of the box. Unlike most 8-bit microcomputers now on the market, the PC has a 16-bit architecture that allows users to easily expand the internal RAM well beyond the 48K or 64K limit of many older designs.

The phenomenal sales growth pattern set by the PC in its first year should mean that much of the hardware and software development for microcomputers in coming years will be aimed in its direction.

The PC has a comfortable keyboard with an accurate but light touch and a reassuring click as each key makes contact. All is not perfect, however. IBM, whose Selectric typewriter keyboard has become the industry standard because of its ease of use and organization, chose to make a few minor but annoying changes when it designed the PC. One is the placement of an

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tra key, a backslash, next to the left upshift button. A second frustration is the design of the two upshift buttons themselves; they're only slightly larger than letter keys and a bit difficult for a typist who is used to Selectric's lily pad. In any case, most typists should need only a few hours of adaptation.

On the positive side, the ten function keys along the left side of the keyboard follow the PC, when used with a suitably powerful word processing program, to mimic a dedicated word processor. The function keys delete words, insert lines, enter text, call menus, reformat text, and perform other assignments.

The PC keyboard is separate from the computer itself, attached by a coiled wire. The distance, angle, and elevation of the keyboard may be adjusted as you type, offering comfort and speed. Some writers might want to place the keyboard on their lap or even stand up as they type. The modular design would also allow you to construct a work station with the disk drives and computer stored above or below the desk surface, leaving more room for papers. The monitor is a separate piece of equipment. You may choose the device that best serves your needs, and place it in the most comfortable position.

The Program

Everyone who wants to process words has different requirements. Some look for an easy way to send short notes. Others want to prepare three-page form letters

for their business. Some write term papers, magazine articles, the Great American Novel, or a new unabridged encyclopedia. Each of these requirements can be met by a different set of hardware options and software.

MERGING is an easy process.

This issue offers reviews of several of the latest word processing programs for the PC. And many more will come. In making your decision, work backwards from the end product you will need. The simplest and least expensive software will easily handle short letters. A moderately powered and priced program will do form letters and short papers and articles. The super packages will breeze uphill on the long pieces as well as providing special effects such as automatic indexing, tables of contents, footnoting, word counts, and spelling and grammar checks.

Memory

Three things should be considered when deciding on memory requirements. How much internal random access memory (RAM) is required to hold the word processing program and your work in progress? How much storage memory in the form of disks (hard or floppy) is neces-

sary to hold your copy? And how many disk drives are required or advisable?

You should probably plan on at least 64K of RAM to afford most PC word processing programs sufficient elbow room. At least one program, Write-On, claims it will work with only 48K, but the manufacturer advises 64K for best efficiency. Another program, Volkswriter, strongly recommends 128K, which requires the addition of at least one memory expansion card inside the PC. WordStor, Perfect Writer, The Final Word, Select, and many others require at least 64K. You may find, as PC's Lawrence Magid indicated in his August review of WordStor, that the program will be very sluggish when operating under the minimum memory setup.

Differences in memory requirements are only partly due to the advanced features of some of the programs. The basic structure of a particular program is a significant factor for some users.

Programs such as IBM's version of EasyWriter, or PowerText or Benchmark, process the copy currently in RAM only. As an example, EasyWriter and PC-DOS occupy about 45.5K of RAM. This leaves only about 18,500 characters in memory for your copy—about 3,500 words. Actually, IBM recommends that files be limited to about 10,000 characters or 1,900 words for efficient operation. [A character count on the menu display page of EasyWriter tells how much space is left in RAM, and the program begins to beep as you near the limit.]



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With a particularly long piece, you would simply divide it up into chapters of ten or more double-spaced pages and breeze along. In fact, EasyWriter and other similar programs allow users to link files for printing and some editing functions. Merging two full-capacity pieces into one may cause some difficulty; it can be done, but not very quickly or conveniently.

If you're writing a book or a lengthy presentation, you might want to look for software that employs disk buffering or virtual memory—the program can handle files larger than internal memory. As you pass the end of available memory, the program "swaps" data to and from the disk. The process is all but invisible to the user, although some programs require that you wait for a few seconds while the disk drive head hunts and pecks back and forth.

When operating under a disk buffering system, choose the length of a file that matches your needs, not the computer's. You will still want to break up your opus into chapters or other divisions because the machine tends to slow down when its buffers are full. The decision is yours. A task such as merging two very long files is an easy process. The theoretical limit becomes the total available capacity of your disk drive—more than 300,000 characters on a double-sided disk.

Monitors

Be kind to your eyes; buy a quality monitor. The extra black and white or color television from the den just won't do for serious word processing. If you want high-resolution color graphics, you'll need an RGB (red-green-blue output) color monitor. If you want color for games and other nontext uses, consider buying a good monochrome monitor and keeping that color television (and its required RF adapter) nearby.

If possible, spend time in front of the monitor before making a purchase. Is an ordinary white on black screen good enough? Or would a soothing white on green or green on black screen be preferable? Perhaps the new amber phosphors are the most attractive. The desirable qualities are sharpness, ease on the eyes, and resistance to glare. The lighting of the room in which your computer will operate is the key factor—not the lighting in the store.

IBM sells two video display cards. The monochrome card is designed primarily for use with IBM's own monochrome green display. It produces the sharpest image, a 7x9 dot character with two descenders for letters such as g, j, p, q, and y. It will not produce graphics.

IBM's color display card, which also drives monochrome monitors as well as color monitors and television sets, produces a slightly less pleasing character drawn with a 5x6 matrix and only one descender. If you're working with single spacing on the screen, you'll be likely to find the descending letters of one bumping into some ascending characters (b, d, f, h, i, j, k, l, and t) of the line below. Examine the differences in the displays produced by the two cards. If the difference seems great to you, you might want to include the monochrome display card in your PC. If you need graphics color as well as the highest resolution monochrome, you'll need both cards.

Disk Drives

You're going to need at least one disk drive; for most applications two would be nice but are not required.

Word processing software must be loaded into the PC's memory from a disk. Unless you have no interest in saving your letters, you'll need a disk as a storage medium. Many programs allow you to operate with only one disk. Some loss of convenience and speed will result, however, if you pop program and data disks in and out to copy, transfer from disk to disk, or check indexing and spelling.

If you're going to start with only one disk, the double-sided, double-density disk is the best bet; it offers twice the storage capacity at much less than the cost of another full drive.

If software is loaded into RAM and stays there (IBM's EasyWriter is a program that operates this way), you're not running. All the commands and messages will be resident at all times.

If, on the other hand, your word processing program requires the PC to copy back to the disk for instructions or special functions (as in WordStar's overlay system), the way to use a one-disk setup is to copy the software onto each and every storage disk for word processing. Then your PC can go back to the one disk for both program and words to process. Before

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to go this route, be sure the software you are proposing to buy is not copy protected copy limited.

Be aware, when taking this route, that you will be sacrificing a not insignificant amount of storage space on your disks. WordStar for the PC, for example, together with COMMAND.COM, takes up about 3,000 characters as delivered—almost of the 160,000-character capacity of a single-sided disk and half a double-sided disk. However, it is possible to reduce the

**IF YOUR
publisher won't look
at a manuscript
made up of dots,
your word processing
investment will not
get much of a return.**

of WordStar and some other programs by removing tutorials and text examples once you are comfortable with the program. If you're completely at ease with a program, don't need all the menu prompts, and can answer printing format and other system queries without the aid of full instructions on the screen, you can go back on some of the overlays. Remember to do your experimenting on a backup disk and not the original.

If you are working on a new untidied encyclopedia or some other lengthy and complex job and your budget allows it, you might consider purchasing a hard disk system. This device, built around a magnetized platter that is usually removable, can store huge amounts of information. A 10-megabyte hard disk (not the largest available) could store about 1.8 billion words, or 18 volumes of 100,000 words each. Remember, however, that you're still going to need a floppy disk drive to enter software programs and to make backup copies for safe storage.

Interests

Not all word processing applications need a printer. The all-electronic office might ship words over a wire or telephone

line from one end of the office to another or from one end of the world to another. And several computers can share a single remote printing facility. Renting time on a high-speed printer owned by someone else is also a possibility. CompuServe, for example, will accept your copy over the telephone lines, print out a hard copy, and mail it back to you.

These applications all require a communications capability in your PC—a communications card with a serial output and a modem to connect your computer to your telephone lines and communications software. For the most common word processing uses, you'll probably want the ability to produce your own hard copy right at your desk. Printing devices have two major subdivisions: dot matrix and daisy wheel. Details of the various attributes may be found elsewhere in this issue.

Dot matrix printers are fast, quiet, and inexpensive. They produce lighter, more coarsely drawn characters, and show off their pin-dot parentage. Daisy wheel printers or converted typewriters are generally slower, noisier, more expensive, and the print looks as if it comes from an electric typewriter.

The question to ask yourself is: Who is going to read my printed product and what kind of prejudices will he or she bring? If your aunt in Dubuque doesn't mind a dot matrix printed letter, you're all set. But if your publisher won't look at a manuscript made up of dots, no matter how well connected, your word processing investment will not get much of a return.

You might try surveying the people who receive your product. If money is no object, consider buying one of each—a dot matrix for quick printings of proofs and a slower daisy wheel for the final copy.

The needs of your expected end product should determine how you equip your word processing computer. Don't buy a Cadillac if you're going to take quick trips around the block. But don't buy a bicycle if your regular output is the computer equivalent of a cross-country expedition.

And then go forth and process. /PC

Corey Sandler is a speech writer and author who works and lives in Albany, New York. A book on business communications scheduled for publication next year and two novels in progress reside in the memory of his IBM Personal Computer.



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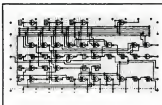
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A typical page of a logic drawing looks like this:



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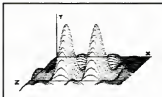
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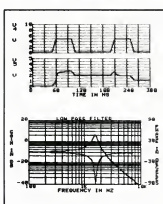


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Typical μCAP AC and Transient Analysis graphs



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The \$87.50 Run(around)

IBM announces a dubious interim licensing policy for its BASIC Compiler's run-time library.

Would you pay \$87.50 to have somebody copy a program that you already own from one disk another? That could be the net effect of recently announced IBM policy for licensing its run-time library software used in conjunction with compiled BASIC programs.

Here's the background: IBM now sells two versions of Microsoft's BASIC language for the Personal Computer. The "interpreter" variant is the original. The central portion of the interpreter version (called BASIC) comes built into the read-only memory of every PC, while the supplementary sections (Disk BASIC and Advanced BASIC) are included when you buy PC-DOS. The new variant is the BASIC Compiler that IBM now sells as a systems software product.

Together, these variants provide the state of both major approaches to programming-language design. Programs can be developed, edited, and revised with ease using the interpreter; once the program is working as desired, it will run substantially faster when processed by the compiler. The interpreter translates your BASIC program one line at a time into the machine code used by the 8088 processor and repeats the translation process each time a program loop causes a line to come around again. The compiler does the translation for the whole program at one time and yields a ready-to-run machine code version that is used thereafter instead of the original BASIC code.]

You have two options when translating BASIC program with the compiler. One choice is to have the program compiled as is. The other is to take advantage of the run-time library, which provides already-translated versions of common instruction phrases. The run-time library, BASRNL.EXE, is one of several features that make up IBM's BASIC Compiler package. BASRNL is loaded into memory side

by side with your compiled program. When told to use BASRNL, the compilation process incorporates references to the library into your program instead of generating duplicate code. For single programs, BASRNL is not an important asset. An average program combined with BASRNL comes to about the same size as the same program compiled to work without BASRNL.

BASRNL's big advantage comes into play when you have an interrelated suite of several subprograms that get moved in and out of memory as you put the master program through its paces. BASRNL needs to be on a disk only once to be used by several programs, whereas a suite of programs compiled without BASRNL might be too big to fit on a single disk. BASRNL cuts disk operation time when shuffling subprograms in and out of memory.

Commercial program developers find it desirable to produce compiled programs using BASRNL. However, they cannot ca-

usually include BASRNL on program copies they sell, for the same reason they cannot include PC-DOS—the program code belongs to IBM and developers have a license to employ BASRNL for their own use only. Developers cannot expect their customers to have BASRNL since it is presently sold as part of the BASIC Compiler package, a costly product that principally appeals to those who develop programs for sale.

To address this problem, IBM is offering program developers the right to purchase BASRNL licenses for resale. In a letter to developers who have inquired about including BASRNL with their software, IBM says it ultimately plans to offer several options for people who want to resell BASRNL. In the meantime, IBM has a temporary policy under which people can buy ten BASRNL licenses for \$350—\$35 apiece.

Applying the usual discount policies of the software business, providing margins for both distributors and dealers, the \$35

One Company's Solution

Clipping coupons for BASRNL bargains.

One company that recently wrestled with the BASRNL question is International Software Marketing, Inc. (ISM), the Syracuse, New York firm that publishes the *Mathemagic* and *Grophmologic* programs.

Mathemagic, a program that assists in the manipulation of mathematical formulas, would not fit on a single disk when compiled without using BASRNL.EXE, and its operation was too slow to be satisfactory when run in its interpreter-BASIC form. *Mathemagic* has a suggested retail price of \$99.95. Rather than nearly doubling the price of his program or dealing with the bother of offering versions with or without

BASRNL, ISM President Stephen Brightbill decided to tread a middle ground. He decreed that ISM products for the PC, that use compiled BASIC, will be compiled to use BASRNL.EXE but will be sold without including IBM's file on the disk. Every package will include a coupon that customers can use to buy BASRNL.EXE from ISM by mail for \$50.

"No matter where people buy our programs, we will invite them to buy BASRNL directly from us," says Brightbill. The \$50 price is designed to compensate ISM for handling expenses while minimizing the burden on software buyers.

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m bought by the program developer will marked up to add \$87.50 to his program's retail price, assuming the program developer won't charge anything to cover handling expense.

The \$87.50 added to the price of your a compiled BASIC program may be ineffectually worthwhile, because it adds \$87.50 to your software library. But will I want to pay \$87.50 again the second

ONE OBVIOUS solution is to sell BASRUN directly to consumers.

When you buy a program using compiled BASIC, considering that you can copy the BASRUN file from your previous purchase? Probably not. This raises the specter of program developers having to sell 50 versions of a program—one with BASRUN and one without. You can be sure such duplication will raise software prices. One obvious solution would be to sell BASRUN directly to consumers, who can then copy it to purchased programs as needed. This is the way PC-DOS is now handled. Another solution that recognizes the convenience of having BASRUN already in place on every disk where it is added would be to slash BASRUN's price and hope to come out even via multi-copy sales. But the current, admittedly temporary policy should be very temporary indeed. Charging people who buy two or more commercial programs using the BASRUN library more than once for the new product is unfair.

/PC

Editor's Note: When we contacted IBM at press time, they informed us that our article reflects a temporary service they are offering to program developers and users, and that they are currently preparing new terms of distribution procedures that offer significant flexibility and benefits.

IBM said that the changes are imminent and that the procedures would be more beneficial to program developers than users.

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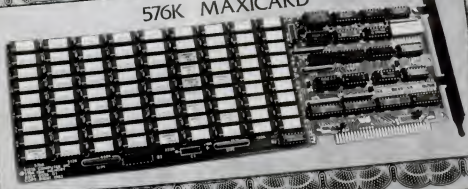
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IN SEARCH OF A WORD PROCESSING PROGRAM

*So you've decided to
purchase a word processor.*

*Offered here are some
practical questions to ask
yourself before taking the
word processor plunge.*

Don't be in a big hurry to pick a word processing program. Once they have made the choice, most people don't change programs even if a better one comes along. It seems easier to stick with one they already know.

The first step in selecting a word processor is to think about how you will use it. Will you be writing a few long reports, many short letters, editing copy for a newsletter, preparing mass mailings, or assembling legal documents from prewritten paragraphs? The second step is to try the software. Run a few experiments: count the number of keystrokes needed for common functions; test it with some

typical tasks. Following are a few questions to ask while evaluating a pro-

How Fast Is Basic Editing?

Most word processing time is spent entering and revising text, so the speed of simple operations such as scrolling, movement, searches for simple patterns, insertion, and deletion is critical. One way to ascertain word processor speed is to create a test document and try a few experiments. I created a 10,000-character document and performed the following operations using two different word processors. While a quick experiment like this will give you a lot, raw speed is not the whole



Figure 1 gives results.

Why Convenient Is Basic Editing?

Convenience and the number and design of simple editing functions may be more important than speed. Does the cursor track the text instead of going off into empty space? If it does track editing, it will be faster, although perhaps confusing to a beginner. Will one or two keystrokes move the cursor to the beginning or end of the current line and to the first or last line on the screen? Is word wrap handled properly when you insert and delete text? When correcting errors, you'll make constant use of simple search for a pattern, but how

Figure 1: Test Results of 10,000-Character Document

FUNCTION	PROGRAM 1	PROGRAM 2
Scroll to end, by lines	33 seconds	38 seconds
Scroll to end, by pages	23 seconds	4 seconds
200-character cursor move	29 seconds	19 seconds
Search to end of document	21 seconds	1.4 seconds
Keystrokes for simple search	7	2

many keystrokes does it take to give the command?

The best way to determine convenience is to spend some time using the program. After a half hour you will know where the frustrations are hidden. Make sure your test document is fairly long since nearly any system will seem easy when you are working on a single paragraph.

Is the Command Structure Consistent?

Consistency is important. If the control key is used to "amplify" one command (turning a word delete into a line delete, for example), it should be used to amplify all commands. Consistent conventions should also be used in moving from one

mode or menu to another: If function key 10 loads the main menu from the print mode, it should also load the main menu from the margin setting mode.

How Are Complex Editing Functions Handled?

Simple functions are used for everything you do. More complex functions such as block operations and complex searching and replacement are used less frequently, so they might be less convenient to invoke. It should be simple to do simple things and possible to do complex things. Those who write only short, unique letters will seldom need these features and should put little emphasis on them.

Find out what the program can do.

They can all move and copy blocks, but can the test program make multiple copies, print a block, write it to the disk, erase it? In searching for patterns, can you specify such things as searching for whole words only and treating uppercase letters properly at the start of a sentence?

Do you work with columnar reports? So, look for a program that can line up columns of figures, do arithmetic, and move columns (not the same as moving blocks).

Convenience is also a factor here. How many keystrokes are required to mark a copy a block? Once a block is marked, how difficult is it to find it or to move the block markers? Again, try a test.

Does it Support Document Assembly?

Word processors are often used to assemble documents from prewritten material. An attorney might prepare wills and deeds, for example, or a politician might answer letters from constituents by stringing together selected "boiler plate" paragraphs. If you have this sort of application, look at document assembly features such

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the ability to include text from other files on disk. To save disk space, you would need only a reference to the file. If actual text must be included, you will use disk space every time the text is read.

Most word processors will include an index file, but can they include a portion of a file? Can you create menus to guide the operator in selecting paragraphs for insertion? The search command might be used to find blank spaces in a standard document, but is it fast and can it be repeated with a single keystroke? When comparing, try out programs by using a document assembly task that reflects your application.

What Happens When Memory Comes Full?

Simple word processors work only with documents that fit entirely in memory. That is satisfactory for writing short letters, but it won't do for a novel. Assuming that the program can handle documents larger than memory, does it read them

automatically from the disk or must you give an explicit command to read or write each portion?

How Big a Document Will Fit in Memory?

This question is related to the one above. Even if the program handles oversized documents automatically, it will slow down whenever the disk is accessed. If you work with large documents, one of your first experiments should test how large a document will fit in memory. Then build a larger file and try a few more scroll-timing experiments such as those suggested earlier. Check to see how long it takes to jump from the start of the document to the end and then back to the start.

If you like a program but the document space is too small, you might be able to increase it by adding more memory to the computer. Many programs have a modest upper limit on document space regardless of the amount of memory installed in the computer. Look for a word processor that can use all the PC's memory.

How Fast Are Transitions Between Editing and Printing?

Some word processors keep editing and printing programs in memory at all times, so moving to print mode is instantaneous. In others the document being edited must be saved on disk, and a separate printing program must be loaded. Some programs even return control to the DOS between these phases. Between these extremes are systems in which the document remains in memory, but the printing routine must be read in from the disk.

The faster transitions of the first technique sound great, but if the printing program is always kept in memory, there will be less space for other things. Either document size will be limited or some editing functions must be omitted.

How important are these transitions? Do you typically work on many short documents or a few long ones? If your documents are short, a system in which the editor and print programs are both in memory would probably be best for you, since you won't need a large document area and

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you'll go through the edit/print cycle often. If you work with long documents, edit/print transitions are infrequent, so it doesn't matter if they are a bit clumsy.

How Convenient Is Simple Formatting?

All word processors provide for control over the basic format of the page, and most printing will be done using standard default values for such things as margin sizes, page numbering, justification, and line spacing. How many keystrokes are necessary to start printing when you use

the default values? How difficult is it to override them (to cause double spacing instead of single spacing, for example)? How difficult is it to change the default values permanently?

Does the Program Do On-Screen Formatting or Use Embedded Commands?

On-screen formatting seems best at first; it is conceptually simpler because what you see on the screen is exactly what will be printed. You will have no surprises such as a letter in which the second page

says nothing but "Sincerely yours." There are some problems, however. Many effects cannot be shown exactly, so in real word processors must use some embedded commands. Furthermore, on-screen formatting slows you down while you are creating and revising your document. It takes time to reformat paragraphs after they have been modified and to mark specific portions of the text. The value of on-screen formatting will vary with application. An author who does a lot of writing and then prints out a rough draft may not want to sacrifice editing speed.

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Can It Format Repetitive Documents?

Will you be using your word processor to prepare repetitive documents? If you'll want a system that lets you create template document with blank spaces to be filled in automatically, using values from a file on the disk, or manually, using values entered by an operator as the letters are being printed.

Many systems are unable to format repetitive documents. Others can merge values from data files but are not able to accept operator input during printing. The best programs allow you to create special prompts to guide the operator and to capture and store the data entered. Pay attention to programming features such as condition testing. Can the system print a letter as well as an entire mailing?

What Are the Report Formatting Features?

Do you write formal reports with section headings and footings, fancy page numbering schemes, footnotes, indexes and tables of contents? If so, check to see whether these things are possible. There are some somewhat specialized capabilities. You should be willing to put up with some complexity to get flexibility. Be sure to try the system using the report format you plan to use. If you want footnotes that fit

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... adjacent pages and are separated in the body of the text by a row of lines, make sure that sort of flexibility is provided.

Can It Do Fancy Printing?

Many printers have the following features: boldface, underlining, superscripts, subscripts, overstriking, proportional character spacing, and precision control for line and character spacing. The last two items are particularly useful if you plan to prepare high-quality documents for a final copy to be pasted up and printed. These effects are important to you, check to make sure that the software supports them. Don't just read the manual or ads—try them out with your printer.

Can the Program Be Copied?

The problem with copy protection is that there are legitimate reasons for copying software. If you want to make backup copies, have data on several working disks, or put it on a hard disk, you will want a program that can be copied.

Is It Compatible with Other Software?

Some auxiliary programs are related to word processing. If you plan to use spell checkers, report formatters, or style checkers, for instance, do they work properly with your word processing files? You may also plan to use your word processor files created by data management or spreadsheet programs. Are you thinking of using it with communications files or to prepare programs to be compiled? If so, tests to make sure its file structure is compatible with your other software.

Is the Documentation Difficult to Learn to Use?

Good documentation will ease the pain of learning a new system, and consistently organized commands, Help screens, and command menus will make it go faster. Make sure you can get rid of the Help screens and prompts once you have learned the system. A simple system that has a few features will be easier to learn than a sophisticated one.

Is the Documentation Acceptable?

This question refers to printed documentation—the manual and reference material. In evaluating these materials, be sen-

sitive to your background. If this is the tenth word processing program you have learned to use, nearly any manual will do for tutorial purposes. But if you are a beginner, the manual should be clearly written, full of examples, and provide sample files and lessons on disk. It should be a useful reference document with a good index and appendixes.

What Format Is Used for the Directory and Text Files?

Most word processing programs use the

directory structure of the computer's operating system. If that is the case, operating system commands may be used for displaying the directory and copying, renaming, and deleting files. That is convenient, but be sure you can do these things while editing. If you discover that the disk is full and you can't save your work, you must be able to display the directory and delete unneeded files. Automatic renaming, the creation of a backup copy when you revise a file, is another feature that you should look for. /PC

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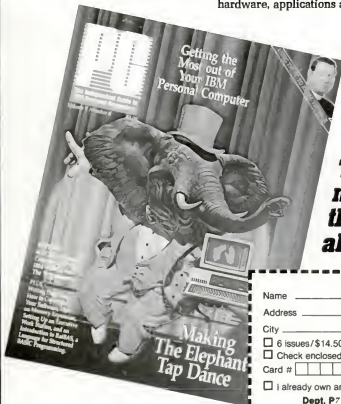
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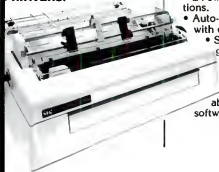
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Dot Matrix And The Printed Word

The daisy wheel outclasses the dot matrix as the printer for purists and professional writers.

Why do some people see red when they see dots? If we knew the answer, we could save ourselves a lot of money, time, and effort. But the fact is that those marvelously fast, efficient, and relatively quiet dot matrix printers haven't yet made the grade for many professional applications.

Publishers, chief executives, editors, and clients still squawk when they see a document printed in dots. "First impressions are very important," says Dominick Abel, a New York literary agent. It's his job to sell the work of his clients to publishing houses, and he says it's more difficult when the print is dotted. "If something comes in to me typed very neatly, I'm predisposed to like it—at least until I've read it," he says. "Words are words, but I do think there's a stigma. Sending dot matrix print is like sending a dirty, dog-eared manuscript. The copies are very often faint, and the printing looks odd and is more difficult to read. It may be the most wonderful prose I've ever read, but you only get one shot. You want a publisher to read your work."

Abel believes that distaste for dot matrix may be linked to a subliminal suspicion that you're receiving the product of a factory rather than an individual. That good typewriters and daisy wheel printers are also used to spit out computer-produced letters and manuscripts doesn't seem to matter. "People don't mind reading clean xeroxes of typewritten copy," he says, "but the dot matrices make people think that they're getting something less than the best."

Abel knows of at least one publishing house that has a hard-and-fast rule of not accepting a final version of copy printed with a dot matrix machine. They may read a draft, but they won't send it on to the typesetter unless it looks like it's from a "normal" typewriter.

Daisy wheel printers are not without their drawbacks for the writer. They're

typically more expensive, noisier, and slower than their dot matrix cousins. In fact, dot matrix printers may be ten times faster than daisy wheels. A dot matrix printer working at 120 cps could print a 350-word page in about 16 seconds, while a 12 cps daisy wheel might require more than 2½ minutes. Think about that difference when you're working on a 600-page manuscript. Expensive office daisy wheel printers can now work in the 60 to 80 cps range.

The daisy wheel and typewriter printers cannot produce graphics. You're limited to a smaller character set (whatever is on the daisy wheel, thimble, or typewriter molds) rather than the computer-addressable characters that most dot matrix printers can draw. Some of the less expensive daisy wheels do not even duplicate all the essential characters of BASIC, so they cannot accurately print out a program listing.

P***UBLISHERS,
chief executives,
editors, and clients
still squawk when
they see a document
printed in dots.***

The manufacturers of dot matrix printers are sensitive to the lack of professional acceptance. At least one manufacturer has come up with a machine that combines both printing modes so that you can print your proofs at high speed with dots and use a daisy wheel for the final copy.

Already on the market are some high-quality dot matrix printers from manufacturers who are trying to upgrade their image by adding correspondence quality

modes. Correspondence quality essentially refers to emphasized printing with dot matrix head making two or more passes over each letter, sometimes offsetting the position by a fraction of an inch. The effect is close to that of a daisy wheel or typewriter, but purists can still tell the difference.

Among these machines are the Microprism Dot Matrix Printer (by Integral Systems), which produces a high-density dot image that the manufacturer of "Maisey" printing; the MP Mary Peter (by Micro Peripherals, Inc.) with two different fonts, a 7x9 matrix for high speed and an 11x9 matrix for correspondence quality; and the Okidata Microline 94 (Microline).

Another alternative is to investigate whether your publisher or client can accept your copy electronically. If you deliver a stream of bits over a telephone line, you don't have to worry about what kind of printer is at the other end. In fact, some publishers are encouraging writers to work with word processors to save time and money, and at least one house has loaned machines to some of its regular writers.

Most publishers still demand hard copy, however. If you have to use a printer, there are several options available. You can challenge a publisher to take your deathless prose the way you send it, regardless of his or her prejudice. (I'm ready to take that chance—I have managed payments to make.) You can buy a daisy wheel or an electronic typewriter, your printer and sacrifice a great deal of speed for a more polished appearance. You can buy a dot matrix printer for your proofs and a daisy wheel for final copy. You can use the services of an outside company, such as CompuServe, and send your copy by disk or modem to the company's printer for proofs or final copy; you can wait until society catches up with technology, if not vice versa.

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Ergonomics is the science of taking the pain and frustration out of computer use, but few people realize that it means more than redesigning tables and chairs.

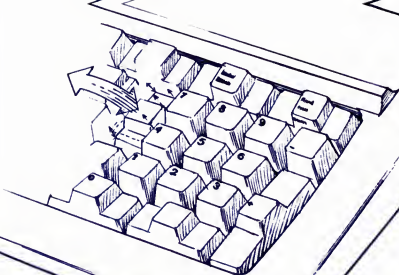
The Hards And Softs Of ERGONOMICS

Working on a personal computer can sometimes be a real pain. Although computers don't cause permanent physiological or psychological disorders, their improper design and use can lead to such maladies as headaches, back pains, eye-

strain, stress, and frustration. Some of the effects of these problems are absenteeism, high turnover, and low productivity — poxes on the efficiency of any company.

Human factors engineering, or ergonomics, is the science of reducing these





mental and physical aches. Based on the idea that computers should be as flexible as they are easy to use, ergonomics demands a blend of practicality and comfort in both hardware and software design. After all, computers were designed to help solve people's problems, not create them.

Hardware Aches and Pains

Most ergonomics research has concentrated on the physiological effects of computer design, particularly of visual display terminals (VDTs) and furniture. Three of the most common and potentially harmful problems plaguing display users are glare, flicker, and bad resolution. Glare, the reflection of light on the screen, can be drastically reduced by using a display, such as the PC Pedestal by IBM, that tilts or swivels, or by applying antireflective treatments to the display's face.

Only high-quality design and components can reduce flicker (the oscillation of the image on the screen that occurs when its illumination fades away faster than it can be renewed) and bad resolution (an unclear image on the screen). The special ergonomic design of the IBM Monochrome Display, a high-resolution monitor with an antiglare, green phosphor screen, effectively remedies all these problems.

Although the screen's character color (green, amber, or white) is a subject of debate between vendors and buyers, the choice is more a matter of personal preference than scientific decree. For those with a preference, companies such as Amdex Corporation and USI International offer full lines of amber, green phosphor, and black and white terminals.

The Hards And Softs of ERGONOMICS

Although ergonomically designed displays are becoming more common, properly designed keyboards are still rare. Ideally, keyboards should be comfortable for the fingers and wrists and should provide feedback to confirm that keying action is taking place. The main aspects of keyboard design are the sculpturing of the keyboard's profile and keycaps, the height of the home-row keys in relation to the desk top, and the keyboard's slope. Since typists have shown improved speed and accuracy with keyboard feedback, ergonomic design should also include audible and tactile feedback, rollover, and a degree of reflectiveness.

Perhaps most important of all, a keyboard and its display should be detached to allow operators to find the most comfortable posture for themselves. A keyboard attached to the display inevitably forces the operator to adopt an incorrect

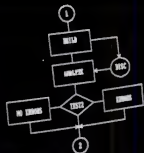
posture with improper eye-to-screen viewing angle and distance (see Figure 1).

Monitors and keyboards don't make an ergonomic environment. Equally important to good working conditions are things as lighting, ventilation, work space layout, and furniture. Featuring a horizontally and vertically adjustable keyboard, the mobile Compucart by Compucart is a good example of ergonomically designed furniture. Other companies such as Lawrence Wood Works in Lawrence, Kansas, and The Bench Collection in Santa Monica, California also make computer furniture engineered to minimize fatigue and improve the user-system interface (USI).

The Art of Ergonomic Software

While the physiological side receives most of the attention, there remains another aspect of ergonomics relatively unknown to the computer-using public: design of ergonomic software is the science, and hardware is the science. Although companies such as IBM, the Mitre Corporation, and Xerox are collecting quantitative data to develop formal theories, software design is usually guided by intuition and experience of analysts and programmers. Their goal is to create software that unburdens users of tasks a computer should be doing for them. Less users have to do to perform a task, easier it will be for them to learn to use computer systems.

The ergonomics of software covers psychological aspects of computer use from what appears on the screen and



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users "talk" with the computer to intelligible documentation and effective training. With the actual software, however, the USI, the channel of communication between the human and the machine, is the center of ergonomic concern. The critical element of command languages determines how the operator communicates with the computer, and vice versa.

Command languages usually consist of three ways of conversing with the computer—menus, mnemonics, and function keys—and each has a place in ergonomic software design. Menus, for example, are better for novices because they are based on recognition rather than memory. Their drawback is that they slow down the interaction process considerably. Mnemonics, however, require the user to recall previously memorized codes. This method is usually preferred by proficient operators because the interaction process tends to be faster than with menus.

Function keys are based on both recognition and recall and are good for frequently used functions. Their problem is that keyboards can accommodate a very limited number of these keys. A fourth

command language, "natural languages," is seemingly ideal, but is not yet suitable for USIs. Programs have yet to be designed that can understand the many ambiguities involved in communicating with natural languages.

Although software designers must create a thoughtful combination of the first three command languages to produce an ergonomic program, there are three other important elements of USIs—HELP!, OOPS!, and response time—that must be considered. HELP! is to assist users who get lost using the system and don't know how to continue. It should be context sensitive so that the system will automatically know which topic the user wants information about. OOPS! is for user detection of human and machine errors and will allow recovery from them with minimal aggravation and loss of data. Response time, the delay between human action and the system's reaction, can vary from a few tenths of a second to a minute or two. To prevent user frustration, response time should match the speed and flow of human thought processes.

How the user communicates with the

computer is important and so is how the system talks back. The design of effective screens, in terms of what they say—how they look—requires consistent structuring, highlighting, and lack of clutter. Screens should teach users clearly, simply the things they need to know.

ALTHOUGH ergonomically designed displays are becoming more common, properly designed keyboards are still rare.

cause highlighting certain information on the screen is key to user comprehension, most terminals have several screen features such as reverse video, high or low intensity, blinking, and underlining.

Designing Ergonomic Software

While allowing operators to use experience gained in one place in as many instances as possible, ergonomists also make their systems adaptable to user's own preferences and levels of effort. Proficient users, for example, should be able to bypass certain operating steps during the execution of a function, yet the system should continue to prompt novices step by step, without the need for software modifications. Considering the diversity of users and potential applications, developing ergonomic software is not a simple task.

One software package that follows the rules of ergonomic design is Context Management Systems, Inc., California. Using the same commands for each, this program consolidates electronic spreadsheets, graphics, database, word processing, and soon telecommunications functions into one package. With this program financial figures can be analyzed in a spreadsheet format; graphics based on these figures can be generated and then inserted into the middle of a manuscript; and the entire package can be telecommunicated to a terminal at any location.

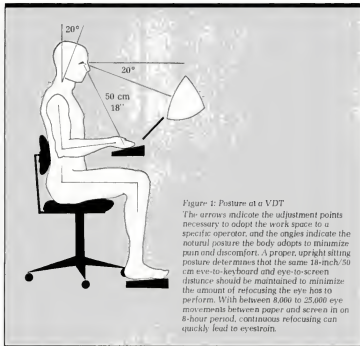


Figure 1: Posture at a VDT
The arrows indicate the adjustment points necessary to adapt the work space to a specific operator, and the angles indicate the natural posture the body adopts to minimize pain and discomfort. A proper, upright sitting posture determines that the same 18-inch/50 cm eye-to-keyboard and eye-to-screen distance should be maintained to minimize the amount of refocusing the eye has to perform. With between 8,000 to 25,000 eye movements between paper and screen in an 8-hour period, continuous refocusing can quickly lead to eyestrain.

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Other examples of software that some way follows ergonomic design concepts are VisiCalc and the other spreadsheet analyzers because of the straightforward and effective manner in which

DEVELOPING ergonomic software is not a simple task.

these programs help users crystallize their thoughts and find the answers they need. WordStar, too, follows these design concepts with its comprehensive reference system.

Low budgeting is the most common reason for uninformative and ineffective software documentation. Too many of today's software designers consider programming the only important aspect to be resolved; they leave training and documentation as an afterthought. Training and reference manuals should be clear, concise, unambiguous, and structured and should include quick-reference cards and indexes. Figures, symbols, and examples should be used to convey ideas effectively. Finally, with every enhancement or update the system receives, the documentation should also be revised.

The next step of the computer revolution has begun. Although advances in technology will make relatively inexpensive devices appear on everybody's desktop and tabletop, the ergonomic design of both hardware and software is not fully understood. In time the actions that will minimize the physical and mental discomforts afflicting computer users will become well defined. As we find ways for computers to help us, we will also eliminate many of the ways they hurt us.

Richard P. Koffler holds Master of Science and Bachelor of Science degrees in Computer Science and Engineering from the University of California, Berkeley and the Massachusetts Institute of Technology, Cambridge, respectively. He is publisher and editor of The Ergonomics Newsletter and has participated in numerous studies that examine the impact of microcomputers on large organizations.



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Capturing Keystro



Illustration: Don Day

save money, minimize proofreading, and increase turnaround speed by using the typesetting interface ability of your PC.

Anyone familiar with traditional typesetting may suspect that the claims made about telecommunications interfaces are too good to be true. But it's a fact that the IBM PC and a compatible word processing package can save you typesetting time and money. If you also use a program that checks spelling, you can reduce the need for proofreading, a time-consuming part

of the typesetting process. Your finished documents can be sent over the phone to one of the growing number of phototypesetting firms equipped to handle telecommunications. In typesetting, time equals dollars. This interface ability can save both because once the document is typed and saved to disk, the typesetter doesn't have to spend costly hours rekeyboarding the text.

I saved an average of 20 to 30 percent on typesetting time by telecommunicating the EasyWriter II manual, North Star's Dealer News, and several OSBORNE/McGraw-Hill books.



Interface Procedures

Typesetting interface procedures (sometimes called "capturing keystrokes") are similar to most other telecommunications procedures. First, you need the hardware and software required to transmit your data: a serial interface board, communications software, and a modem.

IBM produces a basic communications software package called the Asynchronous Communications Support Program, which is available for \$40 from IBM's Systems Products Division. Another good package is PC-Talk from Freeware. Whatever you choose, you'll need a modem such as the Hayes Stack Smartmodem, which sells for \$279, or the Universal 212A Data Modem, which sells for \$695. IBM produces a reasonably priced serial interface board for \$195, but you might consider Quadram Corporation's Quadboard. While comparatively expensive at \$595 to \$995, depending on memory size, it combines four IBM PC boards to leave slots free for further memory expansion. (See PC Product Guide, September 1982.)

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ad your communications software.
pe D-BASIC, PC-TALK/C:1024 and
ess Enter. Wait for the "beep-beep."
urn the modem on.

all the typeshop data line and wait for
e beep.

urn the modem to DATA and place it
the cradle (or hang up, depending on
odem type).

ress the space bar and [Alt]-T; then
pe (disk drive):(file name) and press
nter. The screen will look very strange
uring data transmission. Text appears
th missing letters because every
ighth bit is removed, and all the type-
etting code is visible.

fter all the type is transmitted, turn the
odem back to TALK and hang up.

n leave PC-Talk press [Alt]-X. The
ypeshop now has your text, exactly as
u entered it, ready for typesetting.

Capturing keystrokes is not necessarily
proof. Problems may arise that create
spectably higher rather than lower
s. The most common pitfalls occur in
ing for text format, and type specifica-

Keep in mind that if the manual sys-
tem use is poor, the automated system
erits its weaknesses.

Back to Basics

Before using your typesetting interface
ity, develop good communication with
r typesetter. It is very important to un-

BEFORE using your typesetting interface bility, develop good communication with your typesetter.

stand how type is measured, or
e'd." Specifying type correctly in-
uses the probability of a smooth in-
terjob. You must also know how to enter
code the text to avoid costly human
ervention.

The most common and expensive mis-
ses are made in text formatting (not to be
fused with file formatting). Documents



How to Spec Type

Setting the printed word.

To spec type you must know how it is measured. Historically, several measurement systems have been used. The most common units of measurement are picas and points. If you attempt to discuss pitch and lines per inch, your typesetter's estimation of your knowledge will drop.

Horizontal size is measured in picas. There are 6 picas per inch. Picas are used to measure the width of a typeset line. If you want a line of type 3 inches wide, the typesetting measurement is 18 picas.

Vertical character size and space between lines are measured in points—72 points to the inch. The type itself is measured from the top of the tallest letter to the bottom of the longest letter. Since a point is small, most people use a point scale to measure letters. The scale is printed on clear film and moved over a line of text, to match the print to the scale.

Space between lines, also measured in points, is called "leading" (rhymes with bedding). Before phototypesetting replaced lead type, typesetters inserted strips of lead between lines of printed text to space or "lead" the line. If you want text to have 2 points of space between the lines, add 2 additional points to the size of the type. If you have chosen a 12-point type-

face and want 2 points of leading, you quote your specs by saying, "I'd like my type '12 on 14.'" The typesetter will know to set 12-point type on a 14-point line. A request for 12-point type, with 2 points of lead between lines, and with a line width of 3 inches is stated, "12 on 14 by 18 picas." The written instruction looks like this: "12/14 x 18."

There is more to typesetting than selecting type size. Choosing the right typeface and the style of type is just as important. There are many typefaces, with more being designed every day, and many forms within each face. A single typeface can be condensed, extended, italicized, made bold or light, and so on. Most typesetters offer their clients a variety of typefaces and will have samples of each face they use. Make sure that you choose a face appropriate to the task. Nothing can be more disappointing than a good design ruined by the wrong face.

The art of specifying type encompasses more than these few paragraphs include. If you are interested, your typesetter may have a book to lend you, and any library will have information on typesetting, layout, and the history of the printed word.

—D.R.

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must be processed using typesetting, not word processing, standards. If you use the centering function of a word processing program, for example, the PC determines the center of the line from the number of characters on that line. Each character is the same width. Type composed by typesetting is proportional; the width of each character varies according to its number of width units. An A is the same width as another A in the same typeface but may not be the same as an I or a W. Width units, like height units, are called "points." The measurement used to center a typesetter's line of type is determined by the number of points—not characters—in the line.

Because the PC measures in letter spaces and the typesetter measures in points, many of the text formatting features in word processing programs cannot be used for typesetting. Instead, you format with a series of prearranged codes inserted in the text file. You can also mark the hard copy printout with instructions to the typesetter. In either case, do not use the formatting features of your word processor—not even indents. The more you use those features the more time the typesetter will spend cleaning the files of format code.

Coding Document Files

All typesetters and typesetting machines have unique coding requirements. The codes, which instruct the typesetting computer, are called typesetting mnemonics. The AM Comp/Set, for instance, recognizes \$FT1 as the instruction to use whatever font is designated as font number 1. \$FT2, therefore, instructs the computer to switch to font number 2, and so on.

Some advanced typesetting systems can change any character to a recognizable code, allowing flexibility to customize codes for frequently used formats. For instance, you might want to use > to indicate boldface, and < for standard face. Whatever choice you make, be sure to consult the typesetter first; then be consistent. Don't change code in the middle of the job. Incorrect coding can prove very costly because the typesetter will have to go through the entire file to clean out the bad code and insert corrections.

The typesetter will give you a list of mnemonics. He or she will probably also provide a list of typesetting guidelines used in the shop. If you have any questions about the effect of any code, or any part of

the typesetting process, ask. Talk cheaper than yards of useless type.

Be Sensitive

In years past, typesetting was a craft requiring a great deal of skill and experience. Many of those skills are no longer necessary. Computers have narrowed the gap between skilled typesetters and good typists.

C

OMPUTERS
have narrowed the
gap between skilled
typesetters and good
typists.

typists. Not all typesetters welcome the brave new age. Some bitterly resent it. Many highly skilled people are watching their jobs being whittled away by technology. Be sensitive when dealing with a typesetter. The owner of the shop may value the efficiency of this kind of typesetting, but the employees may feel that their jobs are threatened.

Typesetting Tips

Following the do's and don'ts listed below will help produce cleaner document files and keep typesetting costs down. DON'T:

- use word processing formats of kind (including indents, centering, justification, bold or shadow print, underlines, tabs, headers, or footers).

- use the letters l and o when you mean the numbers 1 and 0.

- transmit files before they have been proofed at least twice.

- interface small jobs.

DO:

- ask questions.

- communicate with the typesetter in his or her own language.

- learn the basics of type specifications and measurements.

If you follow these basic tips, you will find that capturing keystrokes is an efficient and inexpensive alternative for typesetting needs. Remember: Computers don't erase mistakes; they just make them faster.

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	DESCRIPTION
ETB	Interest Apportionment by Rule of the 78's
HU1	Annuity computation program
E	Time between dates
YEAR	Day of year a particular date falls on
SEINT	Interest rate on lease
ARXEN	Break-even analysis
RSLS	Straightline depreciation
RSY	Sum of the digits depreciation
RDB	Declining balance depreciation
RDBB	Double declining balance depreciation
DEP	Cash flow vs. depreciation tables
CK2	Prints NEBS checks along with daily register
CKBK1	Checkbook maintenance program
RTGAGE/A	Mortgage amortization table
TMON	Computes time needed for money to double, triple, etc.
VAGE	Determines salvage value of an investment
ARH	Rate of return on investment with variable inflows
ONST	Rate of return on investment with constant inflows
ELT	Effective interest rate of a loan
L	Future value of an investment (compound interest)
INPAY	Present value of a future amount
SWITH	Amount of payment on a loan
DISK	Equal withdrawals from investment to leave 0 over
EVSL	Simple discount analysis
HDEF	Equivalent & nonequivalent dated values for oblig
DKUP	Present value of deferred annuities
RFUND	% Markup analysis for items
RDVAL	Sinking fund amortization program
LETE	Value of a bond
CKSH	Depletion analysis
CKVAL1	Black Scholes options analysis
RVAL	Expected return on stock via discounts dividends
RDVAL2	Value of a warrant
EST	Value of a bond
AALPH	Estimate of future earnings per share for company
RFELI	Computes alpha and beta variables for stock
WRITE	Portfolio selection model i.e. what stocks to hold
AL	Option writing computations
VAL	Value of a right
ES	Expected value analysis
PRINF	Bayesian decisions
INDF	Value of perfect information
ITY	Value of additional information
PLEX	Derives utility function
NS	Linear programming solution by simplex method
UEI	Transportation method for linear programming
	Economic order quantity inventory model
	Single server queuing (waiting line) model
	Cost-volume-profit analysis
	Conditional profit tables
LOSSP	Opportunity loss tables
IQ	Fixed quantity economic order quantity model
OWSH	As above but with shortages permitted
QOQB	As above but with quantity price breaks
UECB	Cost-benefit waiting line analysis
ANAL	Net cash-flow analysis for simple investment
FINI	Profitability index of a project
	Cap. Asset Pr. Model analysis of project

59 WACC	Weighted average cost of capital
60 COMBAL	True rate on loan with compensating bal. required
61 DISCAL	True rate on discounted loan
62 MERGAL	Merger analysis computations
63 FINRAT	Financial ratios for a firm
64 NPV	Net present value of project
65 PRINDLAS	Lumpsum price index
66 PRINDPA	Pasche price index
67 SEASIND	Constructs seasonal quantity indices for company
68 TIMETR	Time series analysis linear trend
69 TIMEMOV	Time series analysis moving average trend
70 FUPRINF	Future price estimation with inflation
71 MAILPAC	Mailing list system
72 LETWRT	Letter writing system-links with MAILPAC
73 SORT3	Sorts list of names
74 LABEL1	Shipping label maker
75 LABEL2	Name label maker
76 BUSBLUD	DOME business bookkeeping system
77 TIMECLK	Computes weeks total hours from timeclock info.
78 ACCTPAY	In memory accounts payable system-storage permitted
79 INVOICE	Generate invoice on screen and print on printer
80 INVENT2	In memory inventory control system
81 TELDIR	Computerized telephone directory
82 TMUSAN	Time use analysis
83 ASSIGN	Use of assignment algorithm for optimal job assign.
84 ACCTREC	In memory accounts receivable system-storage ok
85 TEKSPAY	Compares 3 methods of repayment of loans
86 PAYNET	Computes gross pay required for given net
87 SELLPR	Computes selling price for given after tax amount
88 ARBCOMP	Arbitrage computations
89 DEPRSF	Sinking fund depreciation
90 UPSZONE	Finds UPS zones from zip code
91 ENVELOPE	Types envelope including return address
92 AUTOEXP	Automobile expense analysis
93 PSFILE	Insurance policy file
94 PAYROLL2	In memory payroll system
95 DILANAL	Dilution analysis
96 LOANAFD	Loan amount a borrower can afford
97 RENTPRCH	Purchase price for rental property
98 SALELEAS	Sale-leaseback analysis
99 RCRVIND	Investor's rate of return on convertible bond
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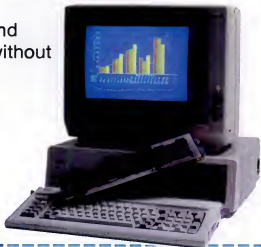
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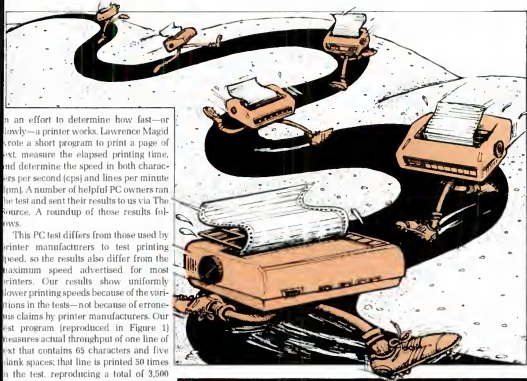


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The PC Speed Test For Printers

A program to test the actual speed of your printer, and results of the test for selected printers.



In an effort to determine how fast—or slowly—a printer works, Lawrence Magid wrote a short program to print a page of text, measure the elapsed printing time, and determine the speed in both characters per second (cps) and lines per minute (lpm). A number of helpful PC owners ran the test and sent their results to us via The Source. A roundup of those results follows.

This PC test differs from those used by printer manufacturers to test printing speed, so the results also differ from the maximum speed advertised for most printers. Our results show uniformly lower printing speeds because of the variations in the tests—not because of erroneous claims by printer manufacturers. Our test program (reproduced in Figure 1) measures actual throughput of one line of text that contains 65 characters and five blank spaces; that line is printed 50 times in the test, reproducing a total of 3,500 characters and spaces. The test includes time for a printer to perform carriage returns, a factor not often used in tests designed to measure a printer's maximum speed. The carriage return factor was primarily responsible for the difference between our test results and generally faster speeds advertised for various printers.

The test program is written in BASIC and creates a standard DOS file. It will probably yield different results, usually slower, if it's run from within a word processing or other type of program. This test does not give accurate results if the printer tested has a special print buffer or spooler. In this instance the data in the test goes into the buffer or spooler's storage area instead of directly to the printer. If the buffer or spooler can be disengaged temporarily, the test will work. /PC

Figure 1: PC Printer Speed Test

```

1  'PC MAGAZINE PRINTER TEST PROGRAM
10  ON ERROR GOTO 690
20  CLS
30  PRINT "PC MAGAZINE PRINTER SPEED BENCHMARK TEST"
40  PRINT:PRINT
50  PRINT "This program is designed to test the speed of your printer."
60  PRINT "It will print 50 lines of text."
70  PRINT
80  PRINT "Each line will be indented five spaces and have 65 characters."
90  PRINT
100 PRINT "At the end of this test, the number of lines, the elapsed time,"
110 PRINT "and the throughput in characters per second and lines per minute"
120 PRINT "will be printed at the bottom of your page and on your screen."
150 PRINT
160 PRINT:INPUT "Specify printer make and model":Z$
190 IF Z$="" THEN Z$="PRINTER NOT SPECIFIED"
200 GOSUB 520
210 PRINT:INPUT "Insert paper in printer and press ENTER":O$
220 W$="" This is a test line. It has a total of 65 characters. ZYXW:[]%*&
230 LW=LEN(W$): tests for length of line

```

Continues

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Figure 1: PC Printer Speed Test (continued)

```

240 L=50
250 PRINT #1.
260 PRINT #1,"PC MAGAZINE PRINTER TEST: ";ZS:PRINT #1.
270 TIMES="0"
280 FOR I=1 TO L
290 PRINT #1, N$
300 NEXT I
310 TS=TIMES
320 MS=MID$(TS, 4, 2) 'defines minutes
330 SS=RIGHT$(TS, 2) 'defines seconds
340 LET M=VAL(MS):REM minutes
350 LET S=VAL(SS):REM seconds
360 TT=(M*60)+S: 'total time in seconds
370 NC="L*M": 'total number of characters
380 TM=M+(S/60) 'total minutes
390 TP=NC/TT: 'throughput
400 PRINT #1.
420 GOTO=450
430 SCRN=1
440 CLS
450 PRINT #1.
460 IF ZZS<>" " THEN ZZS="Throughput report for "
465 PRINT #1,"Elapsed time =";M:"minute(s) and ";S:"second(s) for";
    L:"lines of text."
470 PRINT #1, ZZS:ZZS=""
480 PRINT #1,TP:"characters per second for";NC:"characters."L/TM:"LINES PER
    MINUTE."
500 CLOSE #1:OPEN "SCRN:" FOR OUTPUT AS #1:IF SCRN=1 THEN END ELSE GOTO 430
510 REM
520 CLS
530 PRINT "////// OUTPUT SELECTION MENU /////"
540 PRINT:PRINT
550 PRINT "1. First printer (LPT1:)"
560 PRINT "2. Second printer (LPT2:)"
570 PRINT "3. Third printer (LPT3:)"
580 PRINT "4. First communications device (COM1:)"
590 PRINT "5. Second communications device (COM2:)"
600 PRINT:PRINT
610 PRINT "ENTER THE APPROPRIATE NUMBER: ";OS=INPUT$(1):LOCATE, 1:PRINT OS
620 IF VAL(OS)=1 THEN OPEN "LPT1:" FOR OUTPUT AS #1:RETURN
630 IF VAL(OS)=2 THEN OPEN "LPT2:" FOR OUTPUT AS #1:RETURN
640 IF VAL(OS)=3 THEN OPEN "LPT3:" FOR OUTPUT AS #1:RETURN
650 IF VAL(OS)=4 THEN OPEN "COM1:" FOR OUTPUT AS #1:RETURN
660 IF VAL(OS)=5 THEN OPEN "COM2:" FOR OUTPUT AS #1:RETURN
670 IF VAL(OS)=6 THEN OPEN "SCRN:" FOR OUTPUT AS #1:RETURN
680 BEEP:GOTO 610
690 BEEP:PRINT"ERROR - You probably selected an incorrect device."
700 IF ERR=68 THEN BEEP:PRINT:PRINT "Device unavailable, please try again."
    RESUME 610
710 ON ERROR GOTO 0
720 ' THIS IS THE LAST LINE OF THE PROGRAM

```

Figure 2: PC Printer Speed Test results for a sampling of printers

Printer	Elapsed Time (min.,sec.)	CPS	IPM
Epson (IBM) MX-80 F/T	0:59	59.32	50.85
Epson MX-80 with Grafix and MX-Plus	1:00	58.33	50.00
Epson MX-100 with Grafix-Plus	0:51	88.63	58.82
C. Itoh Starwriter F-10	1:58	30.08	25.42
NEC Spinwriter 5530	1:28	39.77	34.09

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Expanding technology has transformed word processing from a fancy name for typing into a complex, growing industry with opportunities for operators, managers, analysts, and consultants.

Word Processing As A Profession

During the early 70s few people understood what a word processor did. The few keyboard operators in the field trained on the IBM MTST and the AB Dick Magna 1. They met over brown-bag lunches to swap information and support each other through the frustrations of setting up word processing centers. Today these operators coordinate communications for national and international companies, and manage their own service bureaus. As systems analysts they consult with manufacturers and Fortune 500 clients. They attend word/information processing conferences and subscribe to newsletters and trade journals. Schools now have word processing and communications divisions to instruct the beginner in technical, human relations, and analytical techniques. High schools offer occupational programs and community colleges award AA degrees. Personnel agencies have opened schools for operators to train or retrain on the latest equipment. And the International Information/Word Processing Association (IWP) is planning a certification program.

The word processing profession is acquiring a more formalized structure with higher qualification hurdles for the newcomer. He or she is less likely to wander into word processing, but great opportunities are available to those who pursue them. Temporary agencies and many companies offer trainee positions, and vendors offer entry positions such as market support representative. Some people work their way into word processing from data processing and business programs. The chance to coordinate and integrate systems attracts many newcomers.

The most frequently traveled route to word processing begins at the operator-trainee level. Those who learn word processing at an agency school or junior college will have a few hours of actual training on the equipment and a few concepts to go with them. This acquaintance with machines, manuals, and concepts advances the beginner to the level of trainee, working either for a temporary agency at the low end of the pay scale (\$5 to \$9 per hour) or for a company that accepts trainees. During the next 2 to 3 months the trainee acquires experience to begin qualifying as an operator.

Whether training in a community college, agency school, or vendor classroom, newcomers should try to get an overview of the profession. Glancing at equipment catalogs and current newsletters will begin to show the scope of the profession.





See the Resource Guide accompanying this article for a list of word processing publications.

Professional Temporaries

When the phone rings at Pat Franklyn Associates Inc., a temporary agency in San Francisco, more often than not a supervisor is calling for a skilled operator. A typical request is for someone who types 85 wpm, is experienced in litigation, knows how to work from a dictaphone, is available from 6 p.m. to 2 a.m., and has 2 to 3 years experience on a word processor.

To qualify as professional temps, operators first work for agencies that will send them out as trainees. They volunteer at companies, trading work for an opportunity to gain experience on a new machine. A temp with strong office and language skills who operates several machines and has professional references can find temporary work that pays \$10 to \$12 per hour or permanent work that pays \$1,600 to \$1,700 per month. Those temps who know a programming language or know how to program with their equipment can reach even higher salaries of \$15 to \$50 per hour.

When converting to new equipment, companies request temps in order to ease transition problems and coach new operators. Temps increasingly develop new ways to customize software to companies' needs. In emergencies, companies rely on temps to produce under pressure and to adapt to a variety of work environments. Approximately as many men as women work as temps, and ages range from early 20s to mid-70s. Backgrounds vary—performers, artists, attorneys, women returning to the work force, retired military, school teachers, and single mothers.

Because equipment is continually becoming outdated or being upgraded, temps must follow the market and anticipate trends. Staying on top demands frequent retraining, which not all temps are willing to do. As a result, new operators trained on the latest equipment often have an advantage.

A new operator must be prepared to learn, and the learning curve may be steeper than one thinks. Temps have to be prepared to cope with the initial insecurity of not knowing where their next paycheck is coming from. They should register at as many agencies as possible and take the opportunity to work at different companies. Every operator has something to teach.

Business Basics

Setting up shop as a word processor.

If you want to put your PC to work to support micro-based word processing services, you're going into business. Begin by determining what level of business you can handle. Identify a market and inventory your equipment. Can you produce the volume and quality of work your clients require? Do you have word processing software, disk drives, a buffer for your printer, a good typing stand? Depending on the scale of your business, you may need an answering service or some advice from a hookkeeper.

As with any small business you need to define and study the market sector you've selected. Know your competition; what do they offer and what do they charge? Develop estimates and rate sheets for piece or hourly work and determine what you can produce in an hour (including proofreading). Decide how you want to advertise your services and what it will cost.

Once you've settled the issues of which market you want to address and how to let potential customers know you're in business, develop a checklist based on your determination of the quality of service required and the volume of your market. Select a word processing software package that offers the features your work demands. Options for the PC include WordStar, Volkswriter, EasyWriter, and EasyWriter II.

When you examine your hardware, evaluate storage capabilities and printer quality. If you intend to produce long documents or handle a large volume of business, install a hard disk drive. You can purchase 5- and 10-megabyte disks, and up to 20 megabytes are available in separate cabinets. A hard disk allows you to store word processing programs, a spelling dictionary, thesaurus, communications programs, etc. Whether or not you buy a hard disk, copy information onto a floppy as a backup in case of breakdown. Since your disk library will expand as you

produce more work, develop a coherent labeling and storage system for your floppies from the start.

Your final product deserves attention. If your service requires a letter quality printer, look for one with reliability and speed. Models that print 25 to 55 characters per second cost \$2,500 to \$3,500. The NEC Spinwriter at 55 characters per second has a good service record and has demonstrated consistent performance.

To maximize productivity and profits you need software and hardware that enable you to edit and print different documents simultaneously. Adding a buffer (16K to 38K) to your printer reduces interruptions. The buffer holds documents in memory, leaving your CPU free.

Repairs can take time—time you don't have when a client is waiting. If you're depending on your equipment for a living, get a service contract and local backup alternatives. When you purchase your IBM from an authorized dealer, you have the option to sign up for a service contract within 90 days. For an emergency backup, one microprofessional suggests joining a PC user group or posting notice at a dealership; other users in your community may be looking for backups. Some dealers will agree to let you use the display equipment in the store.

Before telling your clients what you need, new arrangement of hardware/software/peripherals can produce, give yourself some trial and error time. If you promise dual columns or merged letters, be sure you have the experience to produce them. By becoming an independent professional, you will attain a new level of expertise on your personal computer. You may discover yourself exploring applications in telecommunications, record maintenance, and data processing. Fun and profit can be linked easily if you're willing to commit both yourself and your PC.

—J.M.

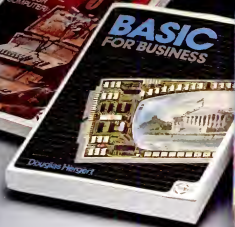
Within a year or two, higher pay, flexible hours, and other opportunities await the top temps.

The Corporate Payroll

In a questionnaire prepared in 1980 for

the IWP by International Data Corporation, 92 percent of the 10,000 businesses surveyed had installed word processors. Over half of the companies without word processors had plans to purchase one in 1981 or 1982. In addition, many large com-

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ies are renting and leasing machines. As means jobs for word processor trainers, operators, specialists, assistant supervisors, phototypesetters, trainers, proofreaders, supervisors, managers, staff assistants, and information managers.

As office automation increases, word processing centers are expanding to encompass new equipment and tasks. Word processing managers, also known as communications managers, now oversee word processing equipment, operators, supply, work output, and information transmissions to printers or reproduction equipment. This job description demonstrates the merging of word processing, data pro-

NEW operators trained on the latest equipment often have an advantage.

cessing, and management. Communications managers restructure work flows and design office space; they develop storage, retrieval, and indexing techniques; and they create data bases and libraries. Training, equipment purchase, and equipment evaluation fall into their jurisdiction. Also do the personnel problems that accompany the new installations.

Ramona Rothe, a word processing/information manager, administers two city centers for Safeway Stores. She began word processing in 1969, when executives considered word processors "glorified lists with expensive equipment." In the ensuing years she has demonstrated to management how word/information processing saves companies time and money. Today she addresses problems of equipment compatibility and division support. She is also responsible for data entry through a timeshare bureau. To stay current, Rothe attends conferences and reads literature that crosses her desk. When new equipment or application requirements arise, she searches back through the literature and vendor catalogs to locate the best hardware or software for the job. Keeping abreast of new publications is a habit in itself.

Resource Guide

Associations, journals, newsletters, and books allow the beginner to survey the field and the expert to advance. The following list gives only a few of these resources. For a more complete listing, consult the Words "Resource Guide" (June-July 1981).

Word Processing Associations

PROFESSIONAL ASSOCIATION OF
SECRETARIAL SERVICES

10650 Irma Dr.
Denver, CO 80233

GOLDEN GATE WORD PROCESSING
EXCHANGE

1255 Post St. #625
San Francisco, CA 94109

INTERNATIONAL INFORMATION/WORD
PROCESSING ASSOCIATION
1015 North York Rd.
Willow Grove, PA 19090

DATAPRO RESEARCH CORPORATION
1805 Underwood Blvd.
Delran, NJ 08075

Books

MICROPROCESSORS FROM CHIPS
TO SYSTEMS

Rodney Zaks
Sybex, Inc.
2344 6th St.
Berkeley, CA 94710

WORD PROCESSING CONCEPTS
Mona Casady
South-Western Publishing Co.
5101 Madison Rd.
Cincinnati, OH 45227

WORD/INFORMATION PROCESSING
CONCEPTS, CAREERS, TECHNOLOGY
AND APPLICATIONS

Marly Bergerud and Jean Gonzalez
John Wiley and Sons Inc.
605 3rd Ave.
New York, NY 10158

INTRODUCTION TO WORD PROCESSING
Hal Glatzer
Sybex, Inc.
2344 6th St.
Berkeley, CA 94710

Magazines

IRM-INFORMATION AND RECORDS
MANAGEMENT

250 Fulton Ave.
Hempstead, NY 11550

INFOSYSTEMS
Hitchcock Publishing Co.
Hitchcock Bldg.
Wheaton, IL 60187

MODERN OFFICE PROCEDURES
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Cleveland, OH 44101

WORD PROCESSING AND INFORMATION
SYSTEMS

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New York, NY 10010

WORDS

International Information/Word
Processing Association
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Willow Grove, PA 19090

Newsletters

INFOWORLD
Popular Computing Inc.
530 Lytton Ave.
Palo Alto, CA 94301

MIS WEEK
Fairchild Publications
7 E. 12th St.
New York, NY 10003

Newsletters

THE INTERNATIONAL WORD PROCESSING
REPORT AND THE INTERNATIONAL
COMMUNICATIONS REPORT

Keith Wharton, Editor
Geyer-McAllister Pub. Inc.
51 Madison Ave.
New York, NY 10010

—J.M.

Mary Lou Geimer, manager of a word processing center, reentered the job market 6 years ago after training in Skyline College's word processing program. She manages a corporate communications center; modems, telexes, facsimile copiers, phone-in dictation equipment, and CRTs fill the room. Geimer enjoys her job

when the center hums with productivity. But she also has to contend with equipment malfunctions and unreasonable deadlines. Inadequate support from vendors and communication carriers can cause frustrating word blockages.

Companies rarely advise their word processors of the latest technology and in-

Do You Use a Printer or Modem?

The average microcomputer "moves" data at 120,000 characters a second. A typical disk drive transfers it at 27,000 CPS. Most printers however plod along at 100 CPS and many modems squeak out 30 CPS. That's quite a drop in efficiency not to mention a waste of computing power!



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formation. In fact, word processors are ten expected to translate current and future technology information for corporate officers. One way to stay informed is join a word processing organization.

Rothe is a charter member of the IV and organized a local chapter in 1975. The IWP, which in its tenth year registered over 109 chapters (15,000 members) in countries, keeps its members informed.

WITHIN
a year or two, higher
pay, flexible hours,
and other
opportunities await
the top temps.

through its newsletter, InterComm, and magazine, Words. The annual conference, Synoptic, presents information specialists and equipment exhibits that introduce new product lines.

For Geimer, the Golden Gate Word Processing Exchange serves as an information forum. Vendors demonstrate equipment and encourage operators to discuss products. Newcomers looking for jobs talk with supervisors. Speakers deliver information. As Mary Lou says, "Even though you have never heard about it before today, tomorrow you'll have to know about it."

MSR: A Good Beginning

Another side of word processing appeals to those who grow restless when seated at a terminal or can't take the strain of staring into a screen all day working with the vendors of hardware and software. A typical entry position for word processors is market support representative (MSR). Support representatives make preinstallation calls to explain equipment to clients and prepare them for class. Follow-up calls and troubleshooting tie the MSR about the company's product line. With experience, representative plan and coordinate larger installations.

This line of work can often lead to position as a systems analyst. The anal

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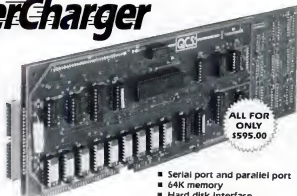
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interviews clients to inventory the equipment on hand and determine its effectiveness in meeting the client's information requirements. After analyzing the workflow and meeting with the client's staff, the analyst recommends equipment purchases and applications.

Support representatives can find positions as specialists in communications or product line, or as liaisons for typesetting services and supply houses. According to Jan Wallace, a systems analyst at Xerox, companies will be looking for candidates with data processing or programming backgrounds who have account experience and proven analytic ability. The field is new, however, and many companies encourage their employees to train as information specialists.

Cottage Industry/Storefront Business

A word processing service bureau can be run from a home or storefront, depending on the size and service requirements of the client base and available capital. Businesses with complementary services (typesetting, graphics, electronic mail service)

THE WORD
processing profession
is acquiring a more
formalized structure
with higher
qualification hurdles
for the newcomer.

sometimes share rental space or associate in a referral network.

Margaret Smith operates a service bureau from her home. Low overhead helps her balance the books, but she says the benefits are more intangible than financial. She enjoys using her word processing to its maximum potential and earning respect for providing excellent service. Building her client base from referrals among small businesses and authors, she has gone on to handle overflow work from larger companies.

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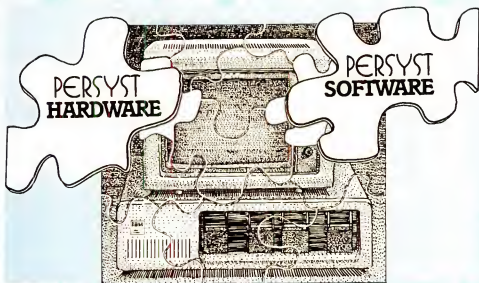
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negotiate realistic deadlines and charge for "rush" jobs. When she first began her business, clients expected that since she worked at home, she would be available beyond normal working hours. Although she enjoys the flexibility of integrating her work with her home life, she does recommend that operators enforce a clear distinction between the two.

When Smith encounters business problems or opportunities, she discusses them with members of the local Professional Association of Secretarial Services. The association addresses her immediate concerns of running a small business more directly than the word processing organizations. In her spare time she reads word/information processing periodicals and newsletters to keep informed.

Margaret Oakley was running a typing service from her home when she decided to "expand into a new level of technology and professionalism." She began evaluating word processors and quickly saw how

revising, storing, and editing documents removes the drudgery from typing. Running a service bureau out of her home has not only given her more flexibility, but has also solved many of the problems inherent in being a working mother.

Oakley finds word processing interesting. Environmentalists, consultants, academics, and writers form her clientele. When she's not working on a project herself, Oakley rents time on her equipment and trains new users, many of whom don't have the means or need to purchase their own equipment. Last year Oakley began cooperating on an innovative project with the author of a botanical work. Data entered on the word processor is telecommunicated to a computer at a major university. The computer sorts the information, a text compiler program typesets the manuscript, and a desk-top laser printer produces initial proofs.

Sometimes the excitement surrounding communications technology can be dis-

tracting. Oakley cautions independent word processors to balance the development of new resources and skills with more immediate requirement of producing income. However, once you have developed a strong client base, maintained a reputation for quality work, and secured a financial cushion for the slow periods, you can experiment with the possibilities of your word processor.

If you're into computers, you'd better be into problem solving. Oakley suggests that beginners appraise their appetite for problem solving and their ability to tolerate frustration before they commit capital and resources to starting a business.

As the manager of a high-volume New York City service bureau, Bea Frai oversees the preparation of customers' reports from word processing to laser printing, color xeroxing, and binding. Via telecommunications she receives documents for clients from remote minicomputers and personal computers. Word processors

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The Consultant

As in most businesses, word processing requires expert consultants. Consultants can be a good choice for entrepreneurs who aren't attracted to the idea of a cotton industry or storefront business.

Carol Lacey, a former teacher who is now a word processor, intends to become a consultant who trains operators in advanced applications and advises them on equipment selection. She began word processing 1 year ago. Since then she has trained on four machines and registered with 15 agencies. To help in her consulting work Lacey has been preparing a log that compares machines, applications, peripherals. She likes to trade in format with other temporaries and often volunteers to demonstrate equipment to newcomers. As a consultant she believes practice rather than theoretical knowledge helps her clients.

Frontier Market

Men and women who never imagined they would use or want to use a computer now converse on the relative merits of their equipment and argue about market trends. With the number of new entrants in the profession, the supply/demand ratio for word processors has temporarily stabilized. Changes in technology could unbalance the current equilibrium and outstrip tendencies to formalize the profession. The person who uses his or her imagination will be the one working 10 years from now, as the opportunities and as technology and the information industry continue to expand.

Janet McCondlless is a researcher, writer and word processor for Sunflower Compositors, an information and word processing business in San Francisco.

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LEGAL/DANIEL REMER

How To Copyright Your

To file or not to file, subject or object code, The Rule of Doubt — Part Two.



ware

This is the second of a three-part series on copyrighting software. Part One explained what a copyright is, how to use proper copyright notice, and where to send for Copyright Office forms. Part Two details exactly how to fill out those forms and resolves issues in connection with copyright law.

Many people place a copyright notice on their software, but they don't take the extra step of registering it with the U.S. Copyright Office. Unlike patent and trademark registrations, copyright registration is easy, inexpensive, and can be done without a lawyer. Forms may be obtained free from the U.S. Copyright Office and the registration fee is only \$10. Why doesn't everyone register? There are two reasons besides sheer laziness. Some lawyers recommend that software be registered only if and when there is a copyright infringement. At that time the software is registered to gain access to the courts, which will not hear an infringement suit without registration. Some serious problems may result with this approach. If you wait to register, you lose the possibility of being awarded attorney's fees and statutory damages resulting from the copyright infringement. You will also have a more difficult time obtaining payment for damages that occurred before you registered. While late registration is better than none, registering late weakens the punch of your copyright.

The second reason people fail to register is the fear of making a program's source code accessible to the public. When you register, the Copyright Office requires you to submit the first and last 25 pages of your program listing with your application. The program listing is kept at the Copyright Office and may be inspected by the public. The public is not allowed, however, to photocopy or hand copy the listing.

People have suggested clever ways of getting around the source code problem: triple spacing the listing, adding lines of comments or remarks, and scrambling the code. The problem with these creative solutions is that they also circumvent the reason the Copyright Office wants the listing in the first place. The office wants to see that the program is, at least superficially, a work of original authorship. It also wants some way of identifying the pro-

gram in the event of a registration date dispute. So reconcile yourself to filing the first and last 25 pages of program listing.

Object Vs. Source Code

Now comes the big question: Do you have to deposit your source code or will object code suffice? The good news is that the Copyright Office will accept object code deposits. The bad news is that the object code is accepted under the Copyright Office's "Rule of Doubt."

The Rule of Doubt is less ominous than it sounds. It means the Copyright Office can't determine from the object code whether the code is an act of original au-

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thorship (see last month's article for a definition of original authorship). The office must take your word for it. Write a letter (see Figure 1) stating that your program is an act of original authorship, and submit it with the application.

The Rule of Doubt doesn't have much impact on your application. Your certificate will look the same and everything will be the same as a source code registration except that a separate folder in a Copyright Office file cabinet will contain an interoffice memo stating that the application was accepted under the Rule of Doubt. This folder is not the same as the one containing your original application. Should you ever find yourself in court, the opposing lawyer may be able to track down this memo. If the case is simply one of program copying, the memo won't do the pirate much good since it doesn't cast doubt on the validity of the copyright. If the case involves stealing a specific but small number of lines of code, you are likely to have a difficult time proving your case anyhow, but the memo could harm your case more.

On the issue of whether you should de-

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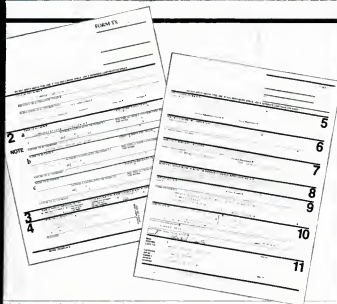
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illed-in example of the copyright Form TX.

at object or source code, I generally recommend filing the source code. Bear in mind that copyright law doesn't protect ideas; it protects only the expression of ideas. If someone wants to copy your program for resale, he or she can copy it from disk more easily than by memorizing its code.

If you are concerned about protecting your ideas, ask yourself if the idea really is unique and worthy of protecting, or if it's just a more elegant expression of a generally known practice. If you have to admit that the value of the idea is in its manner of expression, you should probably protect it by expression by filing. If the value of the idea is in the concept itself, then filing may not be for you. There are relatively few unique ideas and many well-designed programs. Unique ideas are more readily protected through trade secret protection, which I will discuss in Part Three of this series.

If you have a program that is not mass marketed, you may have another good reason for not filing. A combination of trade secret and contract law may be a preferable defense against piracy. This subject is also covered in Part Three.

Preparing an Application

To apply for certification you need Copyright Office Form TX. Write to the

Copyright Office, Library of Congress, Washington, DC 20559; or call (202) 287-8700 after hours and leave a message. I suggest that you ask for several copies. The forms should arrive about a week after they have been ordered.

Form TX is easy to fill out. Use a typewriter and enter the name of the program on the line indicated. See if the rest of box 1 applies to you. It probably doesn't, so go on to section 2.

Historically, section 2 has caused confusion. It asks for the name of the author(s) of the program. If you are the author of the program and own the copyright, put your name on line 1 of section 2. However, if you wrote the program for your employer or as a commission for someone else, the program is a work for hire and the author is the employer—not the programmer.

Whether or not a program is a work for hire is sometimes a matter of dispute. If the employer and programmer disagree, a lawyer should be called in to clarify matters. Let's assume there is no disagreement and go on to the rest of section 2. If the program is a work for hire, ignore the question about dates of birth and death.

Section 2, line 4 asks for a brief description of the material created by the author. If you wrote the whole program, you might say, "wrote the entire software program."

If you had a coauthor, state so, and com-

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plete the questions for each additional author who will share copyright ownership.

Section 3 is self-explanatory except for the word "publication." In copyright law the publication date is the date the program first became available to the public, not the date of manufacture.

Section 4 asks for the names of the copyright claimants. These are the same people you listed in Section 2 unless the authors transferred their ownership. If the parties aren't the same, state how the claimant(s) obtained ownership of the copyright. Ownership could be transferred by "written contract," "will," or "assignment," or one might have won the rights in a poker game.

Section 5 applies only if the program is already registered. Previous registration might have occurred, for instance, in cases of copyright transfer or program modification. Section 6 is used when you modify a program after registering it. For example, you may have designed the program to run on an IBM PC but made some changes so that it would run on an Advantage. If this section applies, briefly describe the original program and the modification work that was done.

REGISTERING late weakens the punch of your copyright.

Section 7 may be skipped if you are registering software. However, there is nothing wrong with listing names and addresses of people, including yourself, who are manufacturing your software.

It is unlikely that section 8 will apply to software registration. If it does apply, enter the information.

Section 9 should show a current address. The Copyright Office may need to contact you about your application, so be sure to include a daytime phone number.

Section 10 asks you to certify that the information in the application is correct. If you are the author, including a work-for-hire author, check the author box.

Finally, fill out section 11. This is a mailing label and will appear in the envelope

Figure 1: Sample Letter for Statement of Original Authorship

Chief of Examining Division
U.S. Copyright Office

Washington, DC 20559

(type date here)

Dear Chief Examiner:

Enclosed please find:

1. A completed registration Form TX for the computer program entitled (type your program name as shown in section 1 of Form TX).
2. The first and last 25 pages of the program in the form of computer listing of object code

I hereby certify that the above named program and the accompanying deposit are works of authorship meeting the requirements of 17 USC 102(a).

Sincerely,

(sign your name)

(type your name)

Figure 2: Sample Letter for Graphics Registration

Chief of Examining Division

U.S. Copyright Office

Washington, DC 20559

RE Request for Special Relief

(type date here)

Dear Chief Examiner:

Enclosed please find:

1. Copyright registration (Form PA) for the audiovisual work entitled (type the name of your program here).
2. A videotape of the work including its demonstration and play mode. The videotape includes a view of the copyright notice as it appears on the audiovisual work. It will play for (fill in number) minutes.

A brief synopsis of the work is as follows: (Include here a short description of the game, e.g., a maze appears on the screen. A small diamond-shaped object runs through the maze controlled by the player. The goal is to get through the maze without running into the walls.)

Please treat the enclosed identifying material in the form of videotape and audio synopsis as fulfilling the deposit requirements associated with this copyright registration.

Sincerely,

(sign your name)

(type your name)

when the approved application is returned to you.

Other Considerations

Let's assume that after carefully analyzing your program, you've decided to register your source code. If it makes you feel better, strip the comment (or REM) statements from the program before list-

ing. I know of one copyright case that was won because of a misspelled word in comment. The original program contained an accidental misspelling that reappeared in the pirated copy. When you prepare your listing be sure the copyright notice appears at the top of the first page. The list the program. Only the first and last pages of code are required.

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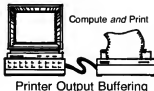
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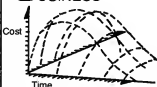
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If you are registering source code, make a \$10 check payable to "Register of Copyrights"; staple it to Form TX; and send the form, the check, and the listing in

ONE copyright case was won because of a misspelled word.

one envelope to the Register of Copyrights, Library of Congress, Washington, DC 20559.

Form TX requests that you deposit two copies of your work with the Copyright Office. Unless you are copyrighting documentation, ignore this instruction; the Library of Congress doesn't want a copy for its collection.

If you decided to keep your source code

a trade secret and to register the object code, make your listing in either hexadecimal or binary code, fill out Form TX as described, and staple a letter like the one in Figure 1 along with your check to the form.

That's all there is to registering source or object code. File an additional Form TX if you want to copyright user documentation. The procedure is exactly the same as outlined above, except that you deposit two copies of the documentation. In many cases it is easier to prove the piracy of written documentation than of programs.

Games

Game programs may be registered as any other program, using Form TX. If the game uses graphics, you may want to protect the graphic images. These images are separate from the program itself and can be protected under their own copyright. Use Copyright Office Form PA, obtainable the same way you got Form TX. Fill out Form PA the same way you filled out TX.

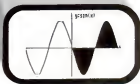
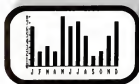
In addition to Form PA the Copyright Office requires a videotape. The videotape should show both the demonstration and playing modes of the game. It should also show your copyright notice as it appears on the screen. Film the CRT as the game plays by itself and film someone playing the game. Don't get too carried away. If the screen changes as the game progresses, include the different screens. Jot down the playing time of the tape.

Finally, write a short letter like the example in Figure 2, and attach it to your application. Send the tape, your check, Form PA, and the cover letter to the Copyright Office.

In a few months the Copyright Office will send you a copy of the registration certificate with an official seal stamped on it and a registration number. File the certificate in a safe place. /PC

Part Three will discuss the measures copyright holders can take to discourage piracy.

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NOVEMBER 1982



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The Personal Investor
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Wayzata, MN 55391
List Price: \$145

Dow Jones Reporter
IBM Corporation
Systems Products Division
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Boca Raton, FL 33432
List Price: \$100

Information is money. Have the correct information at the right time and you stand a better chance of profiting from financial decisions. Have the wrong information or the right information too late, and your chances of making a profitable decision are just that—chances.

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stands. Consider the impact on your investment decisions of receiving detailed financial information abstracted from corporate reports filed with the Securities and Exchange Commission. What if you could obtain consensus earnings estimates of the companies that interest you from analysts at 45 major stock brokerage firms? All this information and a great deal more is available on-line, 22 hours a day, from the Dow Jones News/Retrieval service.

The News/Retrieval (N/R) service was founded in 1974 and is owned by Dow Jones and Company, Inc., publisher of the

Wall Street Journal and Barron's Financial Weekly. An elder statesman among electronic data base services, N/R has some 50,000 subscribers, more than the combined total of two other popular data bases: The Source and CompuServe.

Subscribers to N/R are divided between large and small corporations and professional and private investors. A growing number of individuals are subscribing to the service for the nonfinancial data bases. Among the service's subscribers are most of the Fortune 500 companies and 90 percent of the top financial institutions in the country. All you need to join this financially well-informed group is a PC, an asynchronous communications adapter (or a serial port on a combination card), and a modem. You may also want to consider using one of the software packages reviewed in this article, although it is not necessary to purchase the software in order to subscribe to the service.

The N/R Data Bases

The News/Retrieval service is a collection of electronic data bases designed to supply accurate, timely, and concise finan-

cial information to executive and financial officers, as well as professional and private investors. Eric Bradshaw, National Sales Manager for the service, describes it as "the executive's information system." It is a system designed for those who need to know what's going on in the world of business and finance, to know it in a brief and accurate form, and to know it at the crucial moment in their decision-making process.

Table 1 lists the data bases offered by the service as of October 1, 1982. Bradshaw indicates that additional data bases are being considered and will be added if they measure up to the high standards of the service.

If you are an individual investor, you will find the Current Quotes data base particularly useful. From it you can get the latest high, low, close, and volume traded for any of approximately 8,000 securities. Throughout the trading day you can get current quotes, although you must put up with the standard, minimum 15-minute delay imposed by the stock exchanges. You can get quotes on common and preferred stocks and warrants, corporate and foreign bonds, mutual funds, U.S. Treas-

ury issues, and options. You can also get historical quotes if you want to see how a stock has acted in the past. Monthly sum-

**YOU CAN
obtain day-to-day data
by changing the name
of the stock list you
submit each day.**

maries go back to 1979; quarterly summaries go back to 1978. You can also obtain quotes for the most recent 24-day period.

The news portion of the N/R service has the widest appeal and can provide the most general information. You can read most of the stories that will be in tomorrow's Wall Street Journal, as well as stories from Barron's and items written specifically for the Dow Jones News Service.

You can create your own personal electronic newspaper. The service allows you

Table 1: Summary of news/retrieval data bases.

INTRO <ul style="list-style-type: none"> Free information on News/Retrieval available online. Includes new data base announcements and other information of interest to subscribers. 	WEEKLY ECONOMIC UPDATE <ul style="list-style-type: none"> A single source for economic news. A review of the week's top economic events and a glimpse of the month ahead. 	MONEY MARKET SERVICES <ul style="list-style-type: none"> Weekly economic survey from 40 to 50 of the nation's top financial institutions. Includes median forecasts of monetary and economic indicators.
MASTER MENU <ul style="list-style-type: none"> A complete on-line listing of the information contained in the service, along with detailed instructions on how to access each data base. 	WALL STREET WEEK ON LINE <ul style="list-style-type: none"> On-line transcripts from the popular PBS television program, "Wall Street Week." 	DISCLOSURE II <ul style="list-style-type: none"> 10K extracts, company profile, and other detailed data on over 6,000 publicly held companies. From the U.S. Securities and Exchange Commission.
NEWS <ul style="list-style-type: none"> From the Wall Street Journal, Barron's, and the Dow Jones News Service. Search through headlines and retrieve stories as recent as 90 seconds and as far back as 90 days. 	NEWS/RETRIEVAL WEATHER REPORT <ul style="list-style-type: none"> Weather tables for over 50 major cities. National weather summary and forecast by geographic region. 	CORPORATE EARNINGS ESTIMATOR <ul style="list-style-type: none"> Timely earnings forecasts for 2,400 of the most widely followed companies. Compiled by Zacks Investment Research, Inc. from the research of top analysts at 45 major brokerage firms.
FREE TEXT SEARCH <ul style="list-style-type: none"> Search the news data base using any combination of words, dates, or numbers to June, 1979. A powerful way to find specific data on any subject. 	NEWS/RETRIEVAL SPORTS REPORT <ul style="list-style-type: none"> Scores, stats, standings, stories, and schedules for most major sports. Professional, major college, and top amateur. 	WALL STREET JOURNAL HIGHLIGHTS ON LINE <ul style="list-style-type: none"> Provides on-line headlines and summaries of major stories as early as 6 a.m. (Eastern time). Includes front page news items, front and back page features, market pages, and editorial columns and commentary.
MEDIA GENERAL FINANCIAL SERVICES <ul style="list-style-type: none"> Detailed corporate financial information on 3,150 companies and 170 industries. Major categories include: revenue, earnings, dividends, volume, ratio, shareholdings, and price changes. 	CURRENT QUOTES <p>(Minimum 15-minute delay during market hours)</p> <ul style="list-style-type: none"> Common and preferred stocks and warrants Corporate and foreign bonds. Mutual funds. U.S. Treasury issues, options. 	ENCYCLOPEDIA <ul style="list-style-type: none"> A comprehensive, authoritative and easy-to-use reference tool. More than 28,000 carefully researched and concisely written articles. Completely revised and updated electronically twice a year.

HISTORICAL QUOTES

- Daily volume, high, low, and close.
- Monthly summaries back to 1979.
- Quarterly summaries back to 1978.

to retrieve stories on any one of 6,000 companies, 50 industry groups, or 80 news categories. You might want the latest news on IBM, on "Economic Indicators," or on a specific industry or geographic area of the world. Stories are available 90 seconds after they are placed on the Dow Jones Broad Tape (the news service for stockbrokers), and they remain available for 90 days. Other data bases contain selected stories that go back to 1979.

Disclosure II is a data base that will be of great interest to private investors trying to decide whether to buy stock in a particular company. This data base can provide a constantly updated "super annual report" on any one of the approximately 6,000 publicly owned companies followed by the service. This information is condensed from the many detailed reports these companies must file with the Securities and Exchange Commission.

You can also get weather reports, sports reports, and movie reviews to help you plan your leisure time, and articles from a 28,000-entry electronic encyclopedia to help your kids with their term papers. The encyclopedia, one of the recent additions

to the data base, is updated twice a year.

Subscription Rates

Table 2 shows the current charges for subscribing to N/R. There is a great difference between the rates charged during prime time (6 a.m. EST to 6 p.m. local time) and nonprime time (6:01 p.m. local time to 4 a.m. EST). Nonprime time rates are also in effect on weekends and major holidays.

You can choose from three subscription categories as shown in Table 3: Standard, Blue Chip, and Executive. If you use the service for more than 150 minutes a month during prime time, the Executive Membership, with its one-third discount at all times, will make the most sense. If you have average monthly charges for nonprime-time usage of \$18.75 or more, you will save money by taking the Blue Chip Option, which offers a one-third discount on nonprime-time rates. If you are a moderate user, the Standard Subscription is for you. In addition to discounts, the Blue Chip and Executive memberships provide 6 free hours of usage on new data bases each year. You will also receive a copy of *The Dow Jones News/Retrieval Foot*

Finder, a guide to the system's operations and a list of symbols. None of the three types of membership has a minimum monthly charge.

You connect to the service by using a telephone number for the Tymnet or Teletype system that is closest to you. This will usually be a local call. Charges are for actual connect time rounded to the nearest minute, but you should know that prime-time and nonprime-time rates are determined by the time you connect to the system. If you connect exactly at 6 p.m. local time, you will be charged at prime time rates for your entire session. If you wait until 6:01 p.m. local time, you will be billed at nonprime-time rates.

If you have the necessary equipment and you wish to have information transmitted at the faster 1200 baud rate rather than at the standard 300 baud service, you will be charged rates that are 1.7 times the rates shown in Table 2. Finally, there are surcharges for using some of the services. These are also noted in Table 2.

How To Subscribe

You can subscribe directly to the service or you can purchase either *The Personal Investor* or the *Dow Jones Reporter*. These are the only two programs currently approved for use on the IBM PC by the Dow Jones News/Retrieval service.

The software programs contain the necessary toll-free numbers and the Dow Jones Information Services-User Agreement required to subscribe. You also receive with each package 1 free hour of nonprime-time usage (worth from \$12 to \$54, depending on which services you use). The price of the software also includes the basic subscription fee; however, if you wish to upgrade your subscription to Blue Chip or Executive, you may do so by contacting Dow Jones.

If you wish to subscribe to the News/Retrieval service without buying one of the software packages, you can contact the service at (800) 257-5114. You will have to pay a membership fee that varies with the category you choose, and you will not receive the free hour of nonprime-time usage offered with the software packages.

If you do not use one of the software packages, you can use the simple communications package supplied with PC-DOS (see the description in the IBM PC Guide to Operations), or another communica-

Table 2: Rate Schedule for Standard Subscription

Service	Prime-Time Usage Rates (per minute)*	Nonprime-Time Usage Rates (per minute)*
Dow Jones Business and Economic News (includes News from Dow Jones, Free Text Search, and Wall Street Journal Highlights On Line)	\$1.20	\$0.20
Dow Jones Quotes (includes Current and Historical Quotes)	\$0.90	\$0.15
Financial and Investment Services (includes Disclosure II**, Corporate Earnings Estimator, Media General, and Money Market Services)	\$1.20	\$0.90
General News and Information (includes Movie Reviews, Master Menu, Sports Report, Weather Report, Wall Street Week, Encyclopedia, and World and National News)	\$0.60	\$0.30

*Per minute of connect time rounded to the nearest minute.

**\$2 access fee for one company search in nonprime-time or \$4 in prime time.

Table 3: Subscription Options

Standard Subscription: Free to purchasers of either *The Dow Jones Reporter* or *The Personal Investor*. Subscribers who do not purchase one of these software packages are charged a one-time start-up fee of \$50.

Blue Chip Membership: A \$75 annual subscription fee in addition to the \$50 start-up fee (included with the software package), provides the subscriber with a one-third discount on nonprime-time rates (no discount on prime-time rates). Blue Chip Members also receive at least 6 free hours a year on new data bases and a copy of the *Dow Jones News/Retrieval Foot Finder*.

Executive Membership: \$50 monthly subscription charge includes a one-third discount on prime-time rates as well as all the features of Blue Chip Membership.

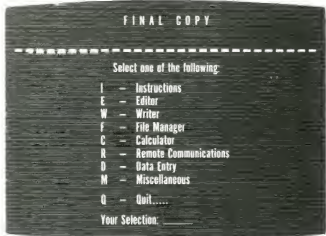
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tions package such as PC-Talk. You won't be able to submit lists for automatic quote retrieval or use the other features of the software packages unless you are capable of writing your own programs. (Not all communications software will be able to connect with N/R; be sure to verify that a program works with this service before purchasing it.)

The Personal Investor

The Personal Investor is a software package from the PBL Corporation that provides the individual investor with a convenient way to gain access to the Dow Jones News/Retrieval service. In addition to needing PC-DOS, display, printer, and disk drive, this package requires a modem and an IBM PC with at least 128K of memory. The program automatically retrieves quotes for common and preferred stocks and then turns the information into a number of useful reports. These reports include the gains and losses on your portfolio, the dividend yield on the stocks you hold relative to both their purchase price and their current price, and a report on the year-to-date short- and long-term capital gains and losses on stock you have sold. All this is useful information, and it's handy to have it automatically calculated each time you update your portfolio through the News/Retrieval service.

The Personal Investor is a model of convenience. Every feature is accessed through a Main Menu, which is organized as a flow chart of the parts of the program (Figure 1). To utilize a feature (Add/Change Stocks or News Terminal, to cite two examples) you use the cursor control keys to move the cursor through the flow chart to the box containing the function you wish to use. When the cursor enters a box, the box flashes to indicate that you can activate that particular feature by pressing the Enter key.

When you have entered a function, you are given the option of having a report printed or having the information displayed on the screen. Each section of the program displays messages that clearly explain your options, how to move about that particular screen, and how to get back to the Main Menu. This makes it easy to use the program without having to refer to the manual constantly.

The Add/Change Screen

The heart of The Personal Investor is

the Add/Change screen. Each Add/Change screen is like a 3x5 file card on which you note facts about each stock, such as its stock exchange symbol, the stock's name, the number of shares purchased, the purchase price, the date, the commission, and other relevant information. You can store a small portfolio of about 20 stocks, 30 purchases, and 30 sales on the program diskette. If you have a larger portfolio and two disk drives, you can create a stock data diskette that will hold up to 300 stocks, 700 purchases, and 500 sales. That should take care of even the most active trader.

The manual for The Personal Investor notes that should your computer be turned off or should a power failure occur while you are viewing the Add/Change screen, the program and your data may be destroyed. You are urged to back up your diskettes—good advice for anything you wish to avoid losing.

Setup and Log-On

The Setup function allows you to enter the Tymnet phone numbers used to access the Dow Jones News/Retrieval service, your password, whether you want a formatted signal sent to your printer after each

Dow Jones News/Retrieval and the Smartmodem

How to interface this data base and a PC using the Hayes Smartmodem.

If you want to use the D.C. Hayes Smartmodem, you must make some modifications to both The Personal Investor and the Dow Jones Reporter. The Personal Investor comes with an insert that explains a simple change that must be made to the Smartmodem to get it to work with the program. Using the Dow Jones Reporter with the Smartmodem is somewhat more involved.

The Technical Editor of PC magazine and I learned this after spending the better part of 2 hours trying to sign on to the Dow Jones News/Retrieval service with the Dow Jones Reporter—without even getting close. The problem stems from the fact that IBM wrote the Dow Jones Reporter assuming the user will have an acoustic modem. The program expects you to dial up the news service, but you can't do that with the Smartmodem. I checked the manual for any clues about the Smartmodem. No reference. I checked for a telephone number to call for problems. No number. Finally, in desperation, I looked in the News/Retrieval manual (not the manual accompanying the program from IBM) and found the telephone number for the News/Retrieval Customer Service Hot Line: (800) 257-5114. I called and explained the problem. They had the answer!

Here is what you do if you have the Dow Jones Reporter and a Hayes Smartmodem:

1. When you are in the Main Menu and wish to connect to the service, select option #2: Manual Entry Mode.
2. When you are prompted, press [F3] to select the manual log-on to the Dow Jones News/Retrieval.
3. You will be asked to insert your data diskette in Drive A. Do so.
4. Press [ENTER] and choose [1] from the menu to begin the manual log-on procedure.
5. The following must be typed in capital letters:
AUX [ENTER]
ATT [ENTER]
The modem will then respond with "OK."

What you type at this point depends on whether you have Touch-Tone or rotary dial service. For rotary dial phones type in:

ATDT[LOCAL PHONE NUMBER].

For Touch-Tone phones, type in:

ATDT[LOCAL PHONE NUMBER].

Type these commands without spaces, and press [ENTER] to execute. You should then hear the modem dial the number, and you should receive notice that you have been connected to the system. Follow the instructions and complete the log-on procedure.

Note: If you make a mistake in typing the commands (for example, you forget to type in uppercase letters), you can type A/ [ENTER] to start over. —A.W.

report, and whether you have an IBM or Epson printer. Once this information is entered, you can automatically log on to the service and have the information printed as you receive it.

The Personal Investor gets you on the News/Retrieval service in two different ways. If you wish to check the prices of the stocks in your portfolio, you enter the box labeled "Dow Quotes" on the Main Menu. If you wish to access the other data bases or connect with some other service such as The Source or CompuServe, you enter the box labeled "News Terminal."

Once you choose one of these two boxes, press Enter. If you have a D.C. Hayes Smartmodem, the sign-on procedure is automatic. If you have an acoustic modem or a different direct-connect modem, you must do the dialing yourself. After that the program automatically sends you your password, terminal identifier, and the other information required to get you safely on the system.

If you are updating stock prices, everything is automatic. After the quotes have been retrieved, you will be signed off the service and returned to the Main Menu. If you have entered the service through the

News Terminal, you will use Dow Jones News/Retrieval commands to move about the various data bases. If you have set up your printer, printing will occur automatically as you view the material.

Shortcomings

While The Personal Investor is very easy to use, it does have some drawbacks and limitations. Perhaps the most severe is that the automatic quote retrieval function works with only common and preferred stocks, even though the N/R data base also has information on foreign, domestic, and government bonds, options, and mutual fund shares. Most serious investors have one or more of these types of securities in their portfolios. Unfortunately, The Personal Investor cannot automatically retrieve quotes for these investments, nor can it incorporate them into its reports on gains and losses, taxes, and income (dividends). This is a serious shortcoming.

This problem can be overcome to some degree through the use of the News Terminal access mode. Once on the service, you can enter the data base for quotes and retrieve the needed information. But this points to the second major weakness of the

program: You must wait from 7 to 10 days before Dow Jones sends you a copy of The Dow Jones News/Retrieval Fact Finder, the manual for the News/Retrieval service that includes all the special codes and symbols necessary to utilize the system. Without it you will have to find your way through the data bases as best you can. Unfortunately, the manual for The Personal Investor refers you to "the Guide" at several points without explaining what it is or from where it will come.

A final drawback of this software is that you have no way within the program to collect price and volume information for a stock over a period of time. This information is often used by investors when making the decision to buy or sell a particular stock. In The Personal Investor, each time the portfolio is updated the new information is written over the old information, thus destroying it. To do an analysis based on price movements you would have to save the information manually.

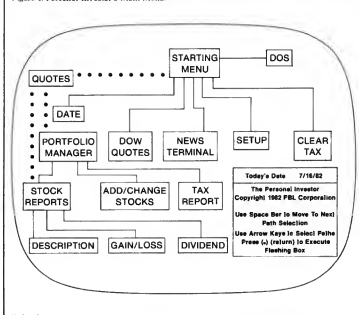
Despite these weaknesses, The Personal Investor is a very easy program to use. An investor who wishes to follow a portfolio made up solely of common and preferred stocks and who wishes to have convenient access to the News/Retrieval service will find this program a useful addition to his or her software library.

Dow Jones Reporter

The only other software program approved by the Dow Jones News/Retrieval service is IBM's Dow Jones Reporter. While this program bears some resemblance to The Personal Investor, it is quite different in both the way it functions and the range of features it provides. In essence, the Dow Jones Reporter is a program for accessing the N/R service. It is menu driven and is generally easy to use, but it does not utilize information from the service to prepare reports.

To use the program you need both the program diskette and a DOS formatted data diskette. Your system needs at least 64K of memory. Before you access News/Retrieval, you set up a number of stock lists on the data diskette. Each disk can hold up to 50 stock lists. The number of stocks in each list varies depending on the length of each symbol. You must, however, limit each stock list to a specific type of security. The Dow Jones Reporter allows you to access all of the quote services automatically, including the ones for bonds,

Figure 1: Personal Investor's Main Menu



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Resident Floppy Disk Storage	Dual 320K (std)	Dual 160K (Opt)	?
Resident Cache Buffer	5M/10M	—	?
Hard Disk Storage	5M/10M	—	?
OPTIONAL OPERATING SYSTEMS (Supported by Company) ²			
MS-DOS (PC-DOS)	Yes	Yes	?
CP/M 86	Yes	Yes	?
MP/M 86	Yes	—	?
OASIS-16	Yes	—	?
XENIX	Soon	—	?
OPTIONAL HARDWARE EXPANSION BOARD (Supported by Company)			
RS-232 Communications	Yes	Yes	?
B/W and Color Display Controller	Yes	Yes	?
Expansion Memory	Yes	Yes	?
Z-80 CP/M 80 Board	Yes	—	?
Cache Buffer/Hard Disk	Yes	—	?
Time/Calendar Board	Yes	—	?
IEEE Bus Controller	Yes	—	?
8" Floppy Disk System	Yes	—	?
8" Hard Disk System	Up to 40 Mbytes	—	?
Tape Cartridge System	Yes	—	?

¹For comparison purposes, typical professional configurations consist of: 16-Bit 8088 Processor, 128K RAM with Parity, Dual 320K 5 1/4" Floppy, DMA and Interrupt Controller, Dual RS-232C Serial Ports, Centronics Parallel Port and Dump Computer Terminal or Equivalent.

²Columbia Data Products also supports CP/M 80® with an optionally available Z-80 CP/M Expansion Board.

*As advertised in BYTE Magazine, August 1982



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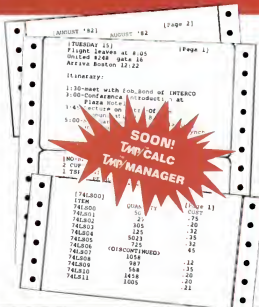
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mutual funds, options, and common and preferred stocks. You can even enter a code that retrieves the quote from a specific exchange such as the Pacific Stock Exchange.

With this program you can obtain day-to-day data by changing the name of the stock list you submit each day. You can accumulate information for as many days

as you like. The obvious way to name the list—a name followed by the date—is ruled out by the program's requirement that stock list names have only letters.

DIRECT *processing would probably require more time and programming skill than the average investor possesses.*

as you like. The obvious way to name the list—a name followed by the date—is ruled out by the program's requirement that stock list names have only letters.

Log-On

The log-on procedure is much like that for The Personal Investor, provided you have an acoustic modem. (If you have a D.C. Hayes Smartmodem, see the box accompanying this article.) To log on to the service, you select the procedure that applies to your equipment—automatic or manual—and the Dow Jones Reporter takes over from there. It prompts you through the dialing procedure, submits your password, terminal identifier, and other required information, and completes the connection to N/R. The program provides on-screen messages to tell you what is happening at each stage. You don't have to sit looking at a blank screen wondering if something has gone wrong.

Once you have logged onto News/Retrieval, you are presented with a "Dow Jones Reporter Services Menu." This menu, generated by the Dow Jones Reporter, lets you access some of the data bases by entering a number. The data bases you can reach from this menu are News Requests, Current Quotes, Historical Quotes, and Disclosure II. You can also request a Display Profile or use the Man-

Shortcomings

ual Entry Mode. Using the Services Menu means that you don't have to type `///CQ` to access the quotes data base or `///DINEWS` to get to the news data base. However, if you want to look at sports, the weekly economic update, or a transcript of the television program "Wall Street Week," you must go through the Manual Entry Mode. In contrast to The Personal Investor's documentation, the manual that contains all the codes for the News/Retrieval service is included with the Dow Jones Reporter.

The Dow Jones Reporter has two major shortcomings. The first is the omission of any reference to using the program with the Smartmodem. The second shortcoming has to do with the way the program uses the system disk and the data disk. For some reason, the copy of the program we were given did not make use of a two-drive system, which led to a great deal of annoying disk changing. This is particularly aggravating when one takes a "wrong turn" in the program. To recover back to the Main Menu often took several disk changes. The authors of the program considered the needs of those who have only one disk drive, but they penalized those who have two disk drives.

It is also disappointing that one doesn't have an easy way to get to the quote information for further analysis. To do the types of reports automatically prepared by The Personal Investor, you would have to print the information with your printer and then reenter it for processing with another program, probably a spreadsheet program. It may be possible to use the files stored on the data diskette, but there is no information about this in the manual. In any case, direct processing would probably require more time and programming skill than the average investor possesses.

The Dow Jones News/Retrieval service contains a wealth of timely and important financial information. If you are an investor, a business executive, or someone who wishes to be well informed, you will profit from a subscription to the service. The two programs described in this article make access to the system easy and convenient. The Personal Investor automatically generates some very useful reports. Both programs provide a membership with the News/Retrieval service and 1 free hour of nonprime-time usage. /PC

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The Portable PC: A Preview Of The Dynalogic Hyperion

A Canadian company enters the market with a "cousin" to the personal computer.

The Hyperion
Dynalogic Info-Tech Corporation
8 Colonnade Rd.
Ottawa, Ontario
Canada K2E 7M6
(613) 226-1383

What weighs 20 pounds, fits under an airplane seat, uses PC software, and has a built-in modem? If the folks at Dynalogic are successful in their development, it will be a device known as the Hyperion. The Hyperion is a portable PC with several added features. Prototypes were demonstrated at the Comdex trade show in June, and the company expects to have production models of the device available during the first quarter of 1983.

Many companies have plans, but Hyperion has what the business community calls the necessary resources, meaning the people and the money to turn the plans very quickly into reality. Dynalogic is a Canadian company that is backed by a venture capital group called Bytec. Bytec is headed by Michael Cowpland, who is president of the Mitel Corporation. Mitel is a very successful high-technology corporation that manufactures and markets state of the art communications equipment in the United States and other countries. If Dynalogic is boosted by Mitel, it could soon become a strong contender in the computer market.

Electrically, the Hyperion will respond like a PC and use PC software and disks. Inside, however, some things are very different. The computer uses an 8088 as its CPU and has room for an optional 8087 floating point processor. It houses 256K of RAM, 20K of display RAM, and 8K of ROM. The low-profile disk drives are each dual sided and provide a total of 327,680 bytes of unformatted storage, or about 800K per side. (How would you like that on your PC?)

The Hyperion uses large-scale integra-



The Hyperion's beautifully styled cabinet houses a great deal of PC-compatible computing power.

tion to reduce the size of the system wherever possible. It uses a new 9007 CRT controller chip, developed by Standard Microsystems in New York, and a new data separator, which allows them to condense the size of the disk control circuitry. The boards are stacked in a vertical configuration and use convection cooling instead of a fan.

The CRT for this device has a 7-inch nonglare tube with an amber phosphor. The prototypes I saw were very clear and easy to read. Many different character sets were available on an 80-column by 25-line screen. The graphics displays included 640x250 dots, 320x250 dots, or IBM PC standard 640x200 and 320x200.

The Hyperion will come with a serial port capable of asynchronous and synchronous communications and a parallel printer port. It will have a built-in modem with an auto-answer capability. The deluxe package will include a hardware clock with battery backup and a video output jack for connection to an external monitor.

Dynalogic says it will package the Hyperion with MS-DOS, Microsoft's Advanced Disk BASIC, Microsoft's Multiplan spreadsheet program, an "executive" text editor, and an electronic mail system.

The Hyperion has a beautifully styled cabinet that houses a great deal of PC-compatible computing power. The keyboard slides under the screen and disk drives for easy transport. Dynalogic did not copy the controversial arrangement of the IBM PC keyboard. The return key has an oversize top, and you don't have to work around the CapsLock key to get at the shift key. The soft keys are grouped horizontally on the top of the keyboard. The complete package should be available for under \$5,000 including software.

Normally, a long and bumpy road comes between the development of a prototype and the actual movement of hardware off a production line. Dynalogic seems to have the backing and the know-how to make this portable PC a reality. It will be interesting to note if this is an accurate projection.

/PC

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User-Friendly Word Processors

Can writers and word processing programs coexist?
What will become of the canons of journalism under the new computer tutelage?

One recurrent scare theme of science fiction is that machines will make slaves of the humans who created them. Has anyone noticed that this day has arrived? The machines have been so subtle in establishing their control that they have gone largely undetected. With the emergence of the computer, however, the technoids have demonstrated their naked power.

It has always been well known that computers are fanatical with respect to forms of address: They will respond to nothing that they have not specifically agreed to recognize. This is the user interface with the general rule of computer behavior, a rule that runs directly counter to the human experience. In the Garden of Eden, you will remember, the general rule of behavior was "Whatever is not forbidden is allowed." The rule established by the computer gods is precisely the reverse: "Whatever is not allowed is forbidden." This canon is known as the Convention of Intention in G. Spencer-Brown's logical calculus, "Laws of Form." Technically, it codifies the idea that the intent of a signal—the way it can be used—is limited to the use specifically allowed to it.

In other words, a single use must be defined for every signal. Put that way, the rule sounds almost trivial, but without it you can't define a system precisely. To function at all, the computer must obey the canonical law, and since the machine must obey it, the rest of us must also. We have bowed to the rule of the gods of the machine: Whatever is not allowed is forbidden.

Machine Rule

Occasionally I feel a twinge of resentment while pumping gas, and I become violent when placed on hold; but by and large I have accepted the new order of



machine rule. I began to sense the first stirrings of rebellion when, on learning my seventh word processing system, I hit a [Ctrl]Y and erased a whole line. On word

FEEDING
human expression
through the
meatgrinder of word
processing makes a
puree of language
itself.

processor number 6, [Ctrl]Y erased everything to the right of the cursor and [Ctrl]Z erased the whole line. The separate designers of these software packages had chosen to allow different uses to the same signal. Why not? There is nothing to say they may not, so they enjoy the paradisaical privilege of doing what they please. What is not forbidden is allowed.

Those of us who use word processors

must learn a set of languages in which the symbols of one member may have the same form but the opposite function as the symbols of another. Knowing other languages is actually a hindrance—it is so many skills to be temporarily unlearned. It is hardly a difficulty, knowing French, to learn Spanish, but teaching the fingers to perform well on one word processor makes them spastic on another.

Even at their best, microcomputer word processors display a kind of macabre humor as they make their human prey dance to the tune of endless control characters. Bent over the keyboard, relentlessly stabbing dot commands, rippling off [Ctrl]Q[Ctrl]B, applying body English when necessary, writers need the agility of a Barishnikov to compose a simple sentence. Chasing the aptly named cursor uses energy that might better be applied to making text meaningful.

The very concept of meaning, of course, is meaningless to a computer, which is solely interested in form. Word processors, in fact, were developed principally to help in the composition of form letters rather than belles lettres. More than half the documentation for the word processor that inspired this piece (Word-

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Stor) concerned formatting a letter for mass mailing.

Writing and Editing

What about writing and editing? For these we are offered a set of arbitrary commands that make manipulating text as graceful as shaving with an axe. We dutifully master these commands and become proficient at using them—in the manner of dancing elephants. Once learned, the dance is simple but outlandish. Then Fate delivers us another word processor, and we find that all we have learned is useless, even counterproductive.

It is time to rebel. Feeding human expression through the meat grinder of word processing makes a puree of language itself. What's really controlled by the [Ctrl] key is thought.

We need not suffer this indignity. Really good text editors exist, mostly on dedicated systems. The best have been designed for newspapers. Essentially they group control functions in a way that is useful for handling text and allow them to be executed with a single keystroke. A paragraph may be defined, for example, by putting the cursor anywhere within it and hitting a key unambiguously labeled Paragraph Define. This approach may not be perfectly adaptable to microcomputers, although user-definable function keys go a long way toward restoring control to humans. What is really needed is a text editor designed from the ground up, not derived from data processing.

Standards

Software designers might well follow the lead of the graphics industry in which, after some years of anarchy, a set of standards has been defined for software tools upon which applications programmers may build useful systems. Using the Core graphics specifications, you can write graphics programs independently of host or terminal. They will run on any FORTRAN compiler.

A set of analogous tools for word processing would consist of subroutines that perform basic tasks of moving text around a screen and formatting it. The applications programmer would define the actual commands used by the word processor.

This approach not only makes it possible to design a universal word processor that is still perfectly flexible and may be modified at will, but it also allows the pro-

gram to take full advantage of any editing tricks that may be resident in the terminal

WORD
*processors display a
kind of macabre
humor as they make
their human prey
dance to the tune of
endless control
characters.*

hardware. The package may be interfaced with file-transfer software resident in the host. It could even have a useful directory, something unheard of in the microcomputer world.

Where is the Moses who will deliver

these software commandments? It took the Standard Graphics Specifications Committee 3 years to agree on the Core system for graphics tools; however, this group had to work from a pure palette, defining graphics primitives on a grid of pixels. Text is already standardized to the extent of ASCII and EBCDIC codes defining keyboard characters. What remains is to group them usefully. Text consists of words and syntax, not letters and spaces. Of all the word processors I have tried or even heard of, only one takes note of this basic fact, and that one in an extremely rigid fashion.

Humans are tool users, as Stanley Kubrick reminds us. "Technical" comes from the Greek word for hand. With the proper tools we can regain control of our language. I hereby pledge full cooperation to the Daedalus who can design the tools for this war of liberation. Somewhere out there is a programmer interested in designing a word processor for text writers. Please get in touch. It's time to put the machines in their place. /PC

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EDITED BY SUSAN HURLEY

Club News

Clubs, bulletin boards, and newsletters enable PC users to capitalize on their fellow users' knowledge.

Arizona

Three subgroups were recently formed by the Phoenix IBM PC Users Group to handle the different needs and demands of group members. The subgroups meet once a month, while the main group meets bimonthly. Two of the subgroups focus on business applications, programming, and high-level languages. The third focuses on member-reviewed hardware and software products. Annual dues are \$12. Contact Jim Serbin, c/o Coopers & Lybrand, 2500 Valley Center, Phoenix, AZ 85073, or Fred Linch, c/o Systems Approach, 4700 N. Central Ave. #102, Phoenix, AZ 85012.

California

The newly created Thousand Oaks Personal Computer Club (TOPCC) recently held its fourth meeting. Club members hold meetings on the last Thursday of the month at ComputerLand, 171 E. Thousand Oaks Blvd., Thousand Oaks, CA 91360. Annual dues are \$10 and plans are underway to hold elections for officers and establish a newsletter and software exchange with other groups. Newsletters from other clubs or questions about joining can be forwarded to the club in care of ComputerLand at the above address.

The IBM PC Owners Club of San Francisco would like to meet with other groups to share demonstrations of programs and other equipment. The club plans to focus future meetings on the PC's performance and BASIC applications. Contact Max Broski at 1880 California St. #12, San Francisco, CA 94109 (415) 775-8882.

Georgia

The Atlanta IBM PC Special Interest Group will sponsor classes in assembly language and BASIC. Software and newsletter exchanges are of interest to the group's 60 members. Anyone interested in joining or conducting a demonstration should contact Randy Bullard at 2965 Atterberry Ct., Decatur, GA 30033, (404) 634-9585.

Indiana

The Northern Indiana IBM PC Users Group is looking for speakers. The club aims to help inexperienced users learn about programs and PC functions. The group has 25 members. Meetings are held at the ComputerLand Learning Center, 719 W. McKinley Ave., Mishawaka, IN 46615. For further information contact Dr. Terry Alley, 318 N. Ironwood Dr., South Bend, IN 46615, (219) 289-5506.

New Jersey

The New Jersey Computer Club will hold meetings at Montclair State College in Montclair, New Jersey. The club was incorrectly identified in the Support section of the PC Product Guide (PC, September 1982) as the New York Computer Club. According to member Irving Lang, the club will invite speakers from the computer industry to speak at future meetings. For information contact Irving Lang at 7 West St., New York, NY 10036 (212) 869-5066.

New York

A meeting to discuss computer games for Christmas shoppers will be held by the New York IBM Personal Computer Users Group on December 15. The group is sponsored by the New York Amateur Computer Club and the New York City Chapter of the Association for Computing Machinery. Meetings are held on the third Wednesday of the month and annual dues are \$15. Attendance reached 150 at the last meeting according to member Joe Rigo. For information contact NYPC c/o SYSDOC Inc., 1385 York Ave., New York, NY 10021.

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Club News

Texas

The BASIC Society is a national group organized to provide PC and other small IBM systems users with information on software and equipment. Membership is open to any individual, organization, company, or school wishing to share information with other users. A monthly newsletter, BASIC Society News, includes editorials, user-contributed articles, technical systems data, software suggestions, professional resources, new product discussions, advertisements, and job announcements. Annual membership fees are \$25 and include a subscription to the newsletter. For information, contact the BASIC Society, Inc., Drawer 345099, Dallas, TX 75234, (214) 484-9900.

Wisconsin

The Zork User Group is different from most other user groups. It does not hold regular meetings or publish a newsletter. Instead, the group provides hints and maps to players of the popular fantasy strategy games, Zork I and II. The group is run by "Mike," who declines to be further identified because of fears that Zork users will start showing up on his doorstep. The group started a year ago when Mike began testing Zork games for Infocom and answering questions from users.

Because the demand for information on the games was so great, Mike decided to write the hint books, which answer many of the questions asked by users. Answers are written in invisible ink. A special ink marking pen comes with the book to dissolve the ink. The books are divided into sections that correspond to different levels in the games. According to Mike, a hint book is also being developed for Infocom's Deadline game. Coffee mugs, bumper stickers, and T-shirts are also planned. For information, contact P.O. Box 20923, Milwaukee, WI 53220-0923.

International

A PC user group is being formed in the Toronto area. For further information contact A.R. Nolf at 620 Crescent, Burlington, Ontario, Canada L7L 5B2.

The Personal Computer Association, an organization dedicated to furthering the interests of PC users on an international level, has been formed in Canada with branches in Germany and Sri Lanka. The association's objectives are to represent the members' interests and aspirations on topics concerning the PC and provide information gathered on a worldwide level. Other clubs are invited to use the organization as a vehicle to exchange information. Discounts and other benefits are passed on to members through PCA's newsletter.

Plans are underway for a 1983 PC Convention to be held in Canada and Germany. Annual club membership is \$30 in Canada and \$35 elsewhere. For more information contact PCA, P.O. Box 251, Ajax, Ontario, Canada L1S 3C3. Telex: 06-986766.

The newsletter of the International Personal Computer Owners Group, Inc. (IPCO) includes product evaluations, new product announcements, programs, programming hints, and articles submitted by members. A software exchange for member-developed software is provided along with discounts on PC products. Contact IPCO, Inc., P.O. Box 10426, Pittsburgh, PA. CompuServe: 71545, 467.

Calendar

Watch for a calendar of events in coming issues of PC. The Calendar will include information on seminars, speakers, trade shows, and other special events of interest to PCers. If you have an item you think would be of interest to our readers, send a letter to Calendar, PC, 1528 Irving St., San Francisco, CA 94122. In order to meet our deadlines, all material must be received at least 3 months prior to publication.

PC magazine will publish a periodic listing of PC user groups and their activities. Drop a line to Club News, PC, 1528 Irving St., San Francisco, CA 94122.

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Most private information utilities have electronic mail and file systems able to store and forward reasonably long text files. These services offer a convenient way to transfer information because the sending and receiving parties do not have to be communicating at the same time. Utilities provide a way around the limitations of time zones and busy schedules. They also make it possible to distribute more than one copy of text files.

Store and forward services have two drawbacks, however. They can cost well over \$25 an hour during the business day, although the rates drop to less than \$6 an hour in the early morning. And they do not provide any simple way to detect and cor-

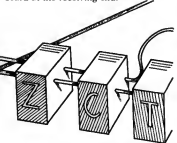
rect file transfer system with error detection and automatic retransmission to insure 100 percent accuracy in the received file.

Protocol File Transfer

A communications protocol is an exchange of specific messages between the transmitting and receiving stations. The transmitting station breaks the file into blocks. Each block of data is analyzed according to a formula and given a numeric value. This number is transmitted as a check sum at the end of the block. The receiving system evaluates the block using the same formula and comes up with its own check sum. If the transmitted and recalculated check sums don't match, the receiving system calls for a retransmission of the block. The two systems will retransmit a block until it either passes the check sum test or fails some prearranged number of times (ten tries is a common failure limit). If the block can't be passed successfully, a new communications link should be tried.

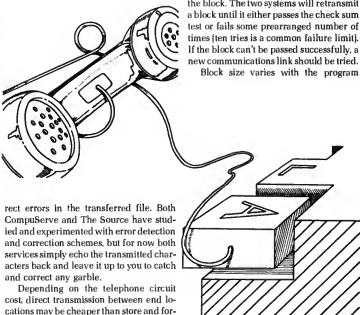
Block size varies with the program

The product of a word processor is a file of words. These words don't always have to be printed on paper. Electronic transfer of word files can be faster and cheaper than printing on paper and entrusting your product to a delivery service. This is particularly true when the words have to be reentered through a keyboard at the receiving end.



Direct and Indirect Transmission

Files are communicated either directly or indirectly. Indirect transmission involves the use of an intermediate storage facility such as The Source or CompuServe. Direct transmission is an end-to-end link with no storage in between.



rect errors in the transferred file. Both CompuServe and The Source have studied and experimented with error detection and correction schemes, but for now both services simply echo the transmitted characters back and leave it up to you to catch and correct any garble.

Depending on the telephone circuit cost, direct transmission between end locations may be cheaper than store and forward transmission. Direct transmission receiving and transmitting stations can use a

allowances and communications conditions. The practical size of the block depends on the quality of the communications circuit in use. If the circuit is bad, the

IF THE CIRCUIT is good, large block sizes should be selected.

block should be small (perhaps 256 bytes) to allow frequent checking and avoid lengthy retransmission. If the circuit is good, large block sizes (up to 2K or 3K bytes) should be selected to reduce the time used in computing parity checks.

Three Programs

Several protocol file transfer programs are available for the IBM PC. The pro-

grams described here are also available for other computer systems, including those running under CP/M-80. This broad availability greatly aids transferring files between various kinds of microcomputers.

Crosstalk is a well-known, mature program with many features (manufacturers have had the time to get the bugs out). It has the ability to select block sizes in 256-byte increments. Crosstalk passes information through a buffer while going to and from the disk, so it is not limited in the size of file it can send or receive. The program is tailored to work with the Hayes Smartmodem; it uses the PC's color capability, and it has an extensive on-line help menu.

ASCOM isn't as friendly or as well documented as Crosstalk, but it is flexible. The block size can be varied in single-character increments. The program includes two timing loops capable of being adjusted in 17 microsecond increments. The capture mode can be selected between outgoing, incoming, or all characters. The average user may not need many of these options, but the capability is there.

Wolf Software markets a file transfer program called Move-It, which, in version 2.4 and earlier, is a special purpose package with little support for functions other than file transfer. It does a protocol file transfer, but lacks the ability to do a non-protocol file transmission.

A major drawback among these programs is that they cannot talk to each other.

UTILITIES provide a way around the limitations of time zones and busy schedules.

Only Crosstalk has some compatibility with other software using the CLINC protocol. There is still no multiprotocol program available for the IBM PC. /PC

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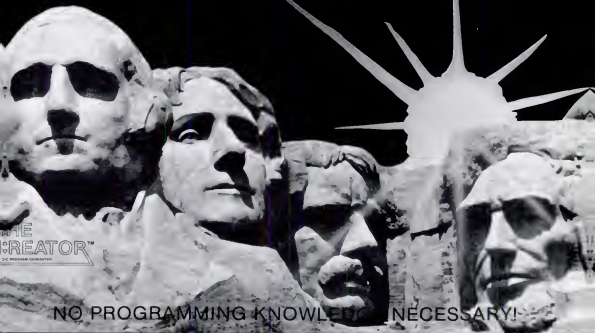
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User-To-User

PC readers pass on programming tips, describe their discoveries, and exterminate bugs. This month a tip for faster BASIC.

Run BASIC Run

This month's column starts with an insight into the performance of IBM BASIC that should be of help to anyone writing BASIC programs. As the BASIC manual indicates on page 1-14, loops will execute faster if you use integer variables. You can further improve performance by declaring frequently used variables at the beginning of a program. The full explanation, including a benchmark test, follows.

The execution time of a BASIC program, especially of programs containing long FOR-NEXT loops or long programs with many unique variable names, can be dramatically affected by explicit declaration of variable names. This is apparently due to a table search performed each time a variable is referenced during the execution of a program.

During execution, BASIC creates a table of variables that is maintained in memory. Each time a variable name is referenced this table is searched. If the name is not found, the new name is added to the end of this table. This technique causes variables to be allocated in the table as they are referenced, possibly causing frequently accessed variables to be allocated near the end of the table.

To overcome this problem, variables that are referenced frequently or are used as indexing variables in FOR-NEXT loops should be explicitly declared at the beginning of the program. Doing so will place the variable names near the beginning of the variable table in memory, thus decreasing the search time required to locate the correct variable name.

The short program below can be used to demonstrate the effect of explicitly declaring variables. Lines 20-40 are used to declare variables A-Z and thus control the allocation of the variables in the variable table. Variable A will be allocated first, B second, etc. The start time of the test is obtained in line 50 and the end time in line 70. Lines 80-110 convert the times and print the start and end times and the aver-

age execution time for the double loop in line 60.

Variable B is used as the index variable for the outer loop since it is accessed only 10 times during execution. Variable A is used as the index variable for the inner loop because it is accessed 20,000 (10 * 2000) times during execution and is the first variable name in the variable table. Running this program will show the average time per execution of the double loop to be approximately 1.5 seconds.

To see the effect of allocation of the variables within the table, change line 60 so that the outer loop index variable is Y and the inner loop index variable is Z. Run the program again: The average time per execution of the double loop is approximately 2.6 seconds versus 1.5 seconds in the first run. This represents a 57 percent increase in execution time.

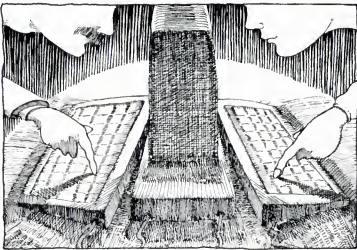
An additional test to determine the effect of using integer indexing variables versus single precision indexing variables can be made by deleting line 10 of the program and running it again. All variables now default to single precision, thus

further increasing the execution time to approximately 3.3 seconds. See Listing 1.

```

Listing 1: A BASIC Test Program
5  'A BASIC test program to determine
6  'the effect of explicit variable
7  'declaration.
8
9  DEFINT A-Z
10 A=0:B=0:C=0:D=0:E=0:
11 F=0:G=0:H=0:I=0
12 J=0:K=0:L=0:M=0:N=0:O=0:
13 P=0:Q=0:R=0
14 S=0:T=0:U=0:V=0:W=0:X=0:
15 Y=0:Z=0
16
17 STS=TIMES
18 FOR B=1 TO 10:FOR A=1 TO 2000:NEXT
19 A:NEXT B
20 SP$=TIMES
21 STI=VAL(STS)*3600+
22 VAL(MID$(ST$,4,2))*60+
23 VAL(MID$(ST$,7,2))
24 SP1=VAL(SP$)*3600+
25 VAL(MID$(SP$,4,2))*60+
26 VAL(MID$(SP$,7,2))
27
28 PRINT "Start =":ST$,"End =":SP$
29 PRINT "Average Time per loop=":
30 (SP1-ST1)/10
31
32 END
  
```

Gary D. Reynolds
Austin, Texas



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The foregoing also holds true for string variables, and it appears that they are stacked in the same table as the integer variables. Try modifying the above listing by adding the following lines:

```
15 AS = "": BS = ""  
45 Z$ = ""
```

Now change line 60 to read:

```
60 FOR B = 1 TO 10: FOR A = 1 TO 2000: AS =  
TIMES: NEXT A: NEXT B
```

Run the program, and you'll get an average time per loop of about 5.4 seconds. Now substitute Z\$ in line 60, and you'll get an average time of about 6.6 seconds. To prove that the pointers to the addresses of the string variables are stacked with the integers, substitute BS in line 60 and you'll see that the average time increases by only a tenth of a second over running it with AS.

To put all this into practice, let's say that the core of your program involved a loop that compared two string variables with the following code:

```
500 FOR I = 1 TO 1000  
510 READ AS: IF AS = BS THEN GOSUB 1000  
...  
...  
600 :NEXT I
```

You would probably speed up your program by having the first line read:

```
10 DEFINT A-Z: AS = "": BS = "":
```

A.F.

Print Where?

For those who are tired of using LPRINTs and making sure a printer is attached and turned on, here is a little trick to make software development easier and less expensive. Insert the following lines of code at the beginning of your BASIC program.

```
10 DEVS = "SCRN": CLS:  
20 PRINT "Do you wish to use a printer  
(Y/N)?":  
30 ANS$ = INPUT$(1): PRINT ANS$  
40 IF ANS$ = "Y" OR ANS$ = "y" THEN  
DEVS = "LPT1:"  
50 OPEN "B".1, DEVS
```

Then when writing your program, use either PRINT#1, or PRINT#1, USING for any output you desire to have sent to the screen or printer, depending on the choice input at line 30. Any output that should go to the screen can be done with the normal PRINT statement.

We have found this to be a great time and paper saver here in the Earle A.

Chiles Microcomputing Center. The primary function of the center is to teach people about computer-based decision systems, but the facility is also used for continuing education courses in microcomputing.

Dr. Alan R. Raedels
Portland State University
Portland, Oregon

String Stretch

When IBM BASIC compares strings of unequal length, the shorter string is considered "less than" the longer string, hence unequal. (Some other BASICs automatically lengthen the shorter string for comparison.) This can present a problem when trying to compare an input string of undetermined length with a field from records within a random file. The solution is one line of code, as follows:

```
IF LEN(NS) < 35 THEN NS = NS + SPACES  
(35-LEN(NS))
```

The above example assumes a field with length 35. The line takes a string of less than 35 characters and pads it with spaces so it is exactly 35 characters and ready for comparison.

Robert C. Avery
Cayucos, California

Scroll Control

IBM's Guide to Operations tells us that [Ctrl]-[NumLock] halts scrolling of the screen, but there's a way to do this as a one-hand operation. [Ctrl]-S serves the same function. Furthermore, if you keep [Ctrl]-S depressed with your fourth finger, you can use your third or index finger to resume and halt scrolling repeatedly.

Dr. Susan Glinert-Cole
South Windham, Maine

Pesky Keys

I've had a problem repeatedly since getting my PC in mid-October 1981. About every 2 or 3 weeks one of the keys on my keyboard decides to quit.

My remedy has been to pry off the guilty key, squirt some photographer's compressed air into the key socket, and remount the key. Sometimes it takes 2 or 3 tries before I can get the spring to seat correctly, but I've never failed to get a key working again.

If this happens to you, try this grassroots, unauthorized service procedure before trucking your keyboard in for an expensive repair.

A.F.

Bug Hunt Continued

This month's final item refers to User-to-User, PC, June/July 1982, where we saw the first generation of BASIC bugs emerging from their cocoons. As later reported, IBM appeared to have eradicated the plague with BASIC version 1.05 (which is the same as the BASIC 1.10 now being supplied with new PCs).

Reports of unexplained, unexpected, and inaccurate results in BASIC keep

**WE SAW THE
first generation of
BASIC bugs emerging
from their cocoons.**

coming our way, however. The following item from Ken Snapp gets a bit more technical than this column's norm, but it may prove instructive and shed light on where some of the insects are hatching.

The "most bizarre bug" demonstrated in Basicstc300 is the easiest to explain. Refer to appendix pages C-9 and C-10 in the BASIC manual for a description of the Floating Point Accumulator (FAC).

While the IBM documentation does not explicitly state it, a zero value for the exponent byte (4A6) is supposed to be sufficient to define a zero value for single- and double-precision numbers without regard to the contents of the remaining 3 or 7 bytes. This is pointed out in the TRS-80 documentation for Microsoft BASIC.

When a numeric variable is not found in the variable table search, the routine sets bytes 4A3 and 4A4 of the FAC to zero in case the variable is an integer, and sets byte 4A6 to zero to take care of single- and double-precision variables. Thus bytes 49F-4A2 and 4A5 are left unchanged. In the Basicstc300 program, whatever value is assigned to the variable B will be left in the 4A5 location.

```
5 'Basicstc.300  
10 INPUT "B=" : B  
20 PRINT "A=" : A  
30 IF A = 0 THEN PRINT "A equals zero"  
ELSE PRINT "BUG!!!!"  
40 PRINT : GOTO 10  
50 END
```

The print routine in line 20 contains

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code that recognizes that the exponent for the variable A is zero, ignores the remainder of the FAC, and prints a zero. The comparison routine invoked in line 30, however, compares all 4 bytes without testing to see if the exponent byte is zero. Therefore, since byte 4A5 of the FAC was not changed from whatever it contained after evaluating variable B, the comparison in line 30 will be equal only when the single-precision representation of the variable B leaves a zero in byte 4A5 of the FAC.

Note that BASIC D1.05/1.10 corrects the single-precision comparison routine but not the double-precision comparison. Simply adding a DEFDBL A-B statement to the Basicst300 program will produce the same error in those new versions of Disk BASIC.

Investigation of the double-precision print bug has produced a number of strange occurrences, but no definitive conclusions. The observable problems in double-precisions, such as that illustrated in Basicst.100 (PC, June/July 1982), seem to have been fixed in BASIC D1.05/1.10.

Various tests have disclosed, however, that heavy use is made of a double-precision power of 10 table in ROM from F600:5F02 through 8189. Comparing the decimal power of 10 values (1D-38 through 1D-01) from this table with calculations made on another Microsoft BASIC system shows numerous discrepancies in the IBM ROM table values. Since this table is used in so much double-precision processing, table errors could very well be responsible for at least some of the odd results.

A simple manual calculation can be used to illustrate one error in the ROM table. The table value for .1 is contained at location F600:602A. Reversing the order of the mantissa bytes so that the most significant byte is on the left and inserting the suppressed leading one, we obtain a hex value of CC CC CC CC CC CD. This is correct since .1 is represented by a repeating binary value with the last byte rounded to reflect the continuing CC pattern. The table value for .01 is at location F600:6022. Again reversing the order of mantissa bytes and inserting the leading one, we obtain a hex value of A3 D7 0A 3D 70 A3 D8. Now we can multiply this value for .01 by ten through a series of additions, then compare the result against the table value for .1.

```
A3 07 8A 30 78 A3 08
A3 07 8A 30 78 A3 08
1 47 AE 14 7A E1 47 80 = .01 X 2
1 47 AE 14 7A E1 47 80
2 8F 5C 28 F5 C2 8F 60 = .01 X 4
2 8F 5C 28 F5 C2 8F 60
5 1E B8 51 E8 85 1E C0 = .01 X 8
1 47 AE 14 7A E1 47 80
6 66 66 66 66 66 70 = .01 X 10
(should be = .1)
```

Shifting left 1 bit to place the decimal point properly, this becomes CC CC CC CC CC CC CE, which is 1 bit greater than the table value for .1. This small difference may seem trivial, but it causes some strange things to happen. For an example, try the following program:

```
10 IF .1 <> .10 THEN PRINT "WHAT?"
20 END
```

In a possibly related situation, the single-precision values for .1 and .10 are stored as different values. For example, the statement PRINT .1 will print .1 while PRINT .10 will print 9.999999E-02.

Finally, confirming the comment in P-Communications (PC, April/May 1982) that BASIC is "recompiled code done for the 8080," there are indeed numerous sections of code that are obviously direct translations from 8080 code. A very common sequence of instructions is:

```
MOV BH, BH
MOV BL, DL
```

The single 8088 instruction MOV BX, DX accomplishes the same result in two fewer bytes. Microsoft was no doubt under a great deal of time pressure in getting out a workable initial version of their superb BASIC. Now that a year has passed since the introduction of the machine, it seems reasonable for us to expect a revised version that makes more efficient use of the rich 8088 instruction set.

Ken Snapp
Denver, Colorado

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THE PROGRAM allows users to test monitors before purchasing them.

Especially helpful to people who depend on color graphics is that the program allows users to test monitors before purchasing them and to check which colors can be displayed on the screen simultaneously.

The Color statement for IBM BASIC can be used in text mode when you have either the monochrome display adapter or the color/graphics adapter in place. With the monochrome display adapter, programs use the Color statement to indicate whether text (any of the 242 letters, numbers, and special characters) will be displayed in white on black, blinking, reverse image, invisible, highlighted, or underscored characters. When used with a color/graphics monitor, the Color statement

determines the color of the characters themselves (foreground color), the color of the box around each character (background color), and the color of the border around the entire screen (border color). (Gray scales instead of color may be discernible on black and white monitors used with the color/graphics adapter.) For text mode applications the format for the Color statement is:

COLOR [foreground] [,background]

[,border]

where:

foreground: a numeric expression between 0 and 31.

background: a numeric expression between 0 and 7.

border: a numeric expression between 0 and 15.

Each parameter specifies a color by number; for example, zero represents black. Thus with the color/graphics adapter, text printed after the statement **Color 1,2,3** will be in blue characters in green boxes on a screen bordered by a darker blue, or cyan. With the monochrome monitor, text printed after this same Color statement will be in underscored characters on a black background. (The border screen is always black with the monochrome adapter.)

In addition to Text mode, the color/graphics adapter supports medium-resolution graphics and high-resolution graphics. High-resolution graphics allows only black and white images. Executing a Color statement in this mode will generate an

PColor Program

```

10 KEY OFF
20 DEFINT A-Z
30 DOSUB 110
40 FK=7
50 PALETTE=1
55 ***** MAIN LOOP *****
60 DOSUB 350
65 IF SCF THEN DOSUB 1750 ELSE
70 IF SCF THEN DOSUB 1020
80 FOR PAUSE=1 TO 2000
90 NEXT
100 GOTO 40
105 *****
109 ***** Define pointers for function keys
110 ON KEY(1) GOSUB 250
120 ON KEY(2) GOSUB 260
130 ON KEY(3) GOSUB 270
140 ON KEY(4) GOSUB 280
150 ON KEY(5) GOSUB 290
160 ON KEY(6) GOSUB 300
170 ON KEY(7) GOSUB 310
180 ON KEY(8) GOSUB 320
190 ON KEY(9) GOSUB 330
200 ON KEY(10) GOSUB 340
210 FOR FK=1 TO 10
220 ON KEY(FK) ON
230 NEXT
240 RETURN
245 ***** Flag FK set by function key
250 FK=1:RETURN
260 FK=2:RETURN
270 FK=3:RETURN
280 FK=4:RETURN
290 FK=5:RETURN
300 FK=6:RETURN
310 FK=7:RETURN
320 FK=8:RETURN
330 FK=9:RETURN
340 FK=10:RETURN
345 IF FK, change display accordingly
350 ON DOSUB 370,430,470,520,570,
420,710,800,850
360 RETURN
365 ***** Displays available *****
370 FK=0: Toggle between SCREENS 0 & 1
380 SCF=(SCF+1) MOD 2
385 ***** Either prepare text mode or...
390 IF SCF=0 THEN DOSUB 620:RETURN
395 *****prepare res. graphics mode
400 WHO
410 DOSUB 1330

```

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PColor Program

```

420 RETURN
430 FK=0 'Change palette, graphics only
440 PALETTE=(PALETTE+1) MOD 2
450 GOSUB 1780 'Update palette info
460 RETURN
470 ON FK GOTO 510,480,470,500 'Pause
480 GOSUB 350 'Change display
490 GOTO 470 'Still pausing
500 FK=0 'Continue bkgnd/bdr cycle
510 RETURN
520 'Rounded foreground
530 IF R#0 OR W#1 THEN RETURN
540 R#0 'Clear rounded bkgnd flag
550 GOSUB 1100 'Print text display
560 RETURN
570 FK=0 'Rounded background
580 IF R#1 OR W#1 THEN RETURN
590 R#1 'Set rounded bkgnd flag
600 GOSUB 1100
610 RETURN
620 FK=0 'WIDTH 40; text
630 IF W#1 THEN RETURN
640 WIDTH 40
650 W#1 'Flag set to first column
660 W#9 'First line of text
670 GOSUB 900 'Prepare text mode
680 GOSUB 1000 'Update border info
690 RETURN
710 FK=0 'WIDTH 80; text
720 IF W#1 THEN RETURN
730 WIDTH 80
740 W#1 'Flag set to middle column
750 W#1 'First line of text
760 GOSUB 900
770 GOSUB 1000
780 GOSUB 1100
790 RETURN
800 FK=0 'Standard characters
810 IF BLINK#0 THEN RETURN
820 BLINK#0 'Clear blinking flag
830 GOSUB 1100
840 RETURN
850 FK=0 'Blinking characters
860 IF BLINK#1 THEN RETURN
870 BLINK#1 'Set blinking flag
880 GOSUB 1100
890 RETURN
899 '***** Text mode *****
900 SCREEN 0;1,0,0
910 FOR FK=0 TO 10 'Function last six
920 KEY(FK) ON 'Function keys
930 NEXT
940 KEY(2) OFF 'Deactivate KEY(2)
950 COLOR 7,0
960 CLS
970 LOCATE 8,0
980 PRINT "COLOR TEXT (SCREEN 0;1,0,0)"
990 PRINT
1000 GOSUB 1860 'Print instructions
1010 RETURN
1019 '***** Change border color *****
1020 BORDER=(BORDER+1) MOD 16
1030 GOSUB 1050
1040 RETURN
1049 '***** Update border information
1050 LOCATE 25,9*W/2
1060 COLOR BORDER,0,BORDER
1070 IF BORDER MOD 8#0 THEN COLOR 7,0
1080 PRINT USING "Border is COLOR %,"
1090 'BORDER;
1090 RETURN
1099 '***** Print text display *****
1100 LOCATE V,W
1110 IF R#1 AND W#1 THEN 1190
1120 FOR F#0 TO 15 'Rounded foreground
1130 LOCATE V#W,F
1140 FOR B#0 TO 7
1150 GOSUB 1280 'Print text
1160 NEXT B,F
1170 IF W#1 THEN 1230 'Skip if WIDTH 40
1180 PRINT " ";
1190 FOR B#0 TO 7 'Rounded background
1200 FOR F#0 TO 15 'Print text
1210 GOSUB 1280
1220 NEXT F,B
1229 'Using monochrome display adapter?
1230 DEF BEO=0
1240 (PEEK(1040) AND 40)=40 THEN 1270
1249 'If so, all done. Otherwise the ...
1249 'color monitor needs a white space
1250 IN LOCATE 0,24th monitor line
1250 BEO=PEEK(1040)
1260 POKE BEO+248*(1-R(W#1))-1,64+32+16
1270 RETURN
1279 '***** Text printing routine ***
1280 FOR F#0 TO 15
1290 COLOR FG# 'Set new fg/bg/bkgnd
1300 IF F#15 AND 8#7 THEN PRINT "15,7";
1310 RETURN
1310 PRINT USING "%%,% "FOIPI
1320 RETURN
1329 'Medium resolution graphics mode
1330 SCREEN 1,0,0,0
1340 FOR FK#5 TO 10 'Deactivate last
1350 KEY(FK) OFF 'six function keys
1360 NEXT
1370 KEY(2) ON 'Activate KEY(2)
1380 LOCATE 5,0
1390 PRINT "MEDIUM RESOLUTION COLOR DRAP
NICS"
1400 PRINT SP(13)"(SCREEN 1,0,0,0)"
1410 GOSUB 1860 'Print instructions
1420 LOCATE 1,1
1430 PRINT "Changing palette changes"
1440 PRINT "the 4 foreground colors"
1450 PRINT "displayed at one time."
1460 FOR F#0 TO 3 'Boxes of color
1470 LOCATE 10#F#4,3,0
1480 PRINT F#" "
1490 TOP=55;F#3 'Top line
1500 BOT=10#F#23 'Bottom line
1510 LINE (272,TOP)-(319,BOT),F,BF
1520 NEXT
1530 LOCATE 13,1
1540 PRINT "For the background and"
1550 PRINT "palette chosen by the"
1560 PRINT "statement COLOR "
1570 PRINT "a foreground number of 4"
1580 LOCATE 18,1
1590 PRINT "Text (for SCREEN 1,0,0,0)"
1600 PRINT "is printed in foreground"
1610 PRINT "color 3. Text is invisible"
1620 PRINT "for COLOR 6,0 and COLOR 7,1"
1630 PRINT "and COLOR 14,0 and COLOR 15,"
1640 LOCATE 24,12
1650 PRINT "Palettes is COLOR "
1660 LOCATE 25,10
1670 PRINT "Background is COLOR "
1680 FOR B#1=25 TO 31 'Extend brackets
1690 LOCATE 40-B#1,B#1
1700 PRINT " "
1710 LOCATE B#1-8,B#1
1720 PRINT " "
1730 NEXT
1740 RETURN
1749 '***** Change background color **
1750 BACKGROUND=(BACKGROUND+1) MOD 16
1760 GOSUB 1780
1770 RETURN
1779 '***** Update bkgnd/palette info
1780 LOCATE 15,17
1790 PRINT USING "%%,% "BACKGROUND,PALE
TTE
1800 LOCATE 24,29
1810 PRINT USING "%%,2PALETTE;"
1820 LOCATE 25,30
1830 PRINT USING "%%,% "BACKGROUND;
1840 COLOR BACKGROUND,PALETTE
1850 RETURN
1859 '***** Function key instructions
1860 PRINT "F#1 = To Change Mode (TEXT
or GRAPHICS)"
1870 IF SCR#0 THEN LOCATE 4,1;GOTO 1890
1880 PRINT SP(19)"(F2) = Change Palette"
1890 PRINT "F#3 = To Pause "
1900 IF SCR#0 THEN PRINT " "
1910 PRINT "F#4 = To Continue"
1920 IF SCR#0 THEN 1990
1929 'Following for text display only
1930 IF W#1 THEN 1950 'WIDTH 80 has
both rounded fg and rounded bkgnd
1940 PRINT "F#5 = Rounded fg/bg =
Rounded Bkgnd"
1950 LOCATE 6,1
1960 PRINT "F#7 = WIDTH 40 (F8) =
WIDTH 80"
1970 PRINT " " Foreground character cho
ices"
1980 PRINT "F#9 = Normal or (F10)=
Blinking"
1990 RETURN
2000 END

```

illegal function call error. Medium-resolution graphics, however, does allow color. To enter this mode, execute the BASIC statement **SCREEN 1,0**. Subsequent statements will be executed according to the rules for medium-resolution color graphics until another Screen statement sets a new mode. **SCREEN 0,1** will reinstate the high-resolution graphics mode.

In the medium-resolution graphics mode the Color statement chooses one of 16 background colors. Not to be confused with the background in Text mode, the background in medium-resolution graphics mode refers to the entire screen, including the border, save those points that

have been colored by graphic statements (Pset, Preset, Line, Circle, Paint, and

THE COLOR statement determines the color of the characters themselves.

Draw) and printed text. When a new background color is chosen (through execution of a Color statement), the entire back-

ground is immediately recolored.

Each graphics statement can put one of four colors on the screen by specifying the color number: 0, 1, 2, or 3. (Printed text is always displayed as color number 3.) Color number 0 is clear; it looks the same as the background color. The colors associated with the numbers 1, 2, and 3 depend upon which of the two palettes you are using. The available colors are:

Color	Palette 0	Palette 1
1	Green	Cyan
2	Red	Magenta
3	Brown	White

Palettes are selected by the Color statement. When you change the palette, all the

Software Breakthrough...

NEW QUIKPRO + PLUS WRITES PROGRAMS FOR YOU IN MINUTES ON YOUR Micro

Technical Review
by Wayne Hepburn

QUIKPRO + PLUS is a new breakthrough in software for microcomputers from ICR-FutureSoft.

Until now, whenever you wanted a new separate program in BASIC (Microsoft Basic/MBasic/Basic 80/Oasis Basic), you had to spend a lot of dollars for it, or a lot of hours creating it (if you have the know-how). That's all in the past now.

Anybody who can turn on a computer can write a program, quickly, with this new Quikpro+Plus software which generates programs for you. Quikpro+Plus is the invention of Joseph Tamargo of Florida. His brilliant approach to program writing allows you to tap the real power and speed of your microcomputer, and it is about time this happened.

I interviewed him to find out more about Quikpro+Plus and pass this valuable information to you. He told me "The best part of this software is that it gives you a separate custom program every time you use it. The resulting program is produced, error-free, in BASIC (Microsoft Basic/MBasic/Basic 80/Oasis Basic, as appropriate to your system) for you by Quikpro+Plus. What's more, you can list your new program, look at it, see what makes it tick, and modify it as you wish."

You can also, customize, enhance, alter, and even copy the programs you create with Quikpro+Plus. This is because programs created by Quikpro+Plus are structured, easy to follow, and include many REMARKS statements right in the program listing. I don't know of any other software with the flexibility and ease of use I found in Quikpro+Plus.

HUNDREDS OF APPLICATIONS...

For Education, Business, Hobby, Home, Science, Personal, etc. a partial list includes programs like these: Financial Forecasting, Expense Planning, Data Access and Retrieval, Modeling, Record Keeping of all kinds, Statistical Data Banks, and much, much more. Quikpro+Plus cuts the time it takes to generate a new custom program down to a few minutes. That's true. I saw a

letter from a user who created a separate program in Basic within fifteen minutes after reading the clear, simple, complete Documentation & Operating Manual for Quikpro+Plus. The software will generate File Handling and Data Entry Programs in a file format, drawn right on the screen by user. Programs created by Quikpro+Plus produce standard ASCII Data Files allowing data to be easily accessed by other programs, other micro's, and even main frames.

HOW IT WORKS...

The operation of Quikpro+Plus is simple and easy. On your screen you answer questions which appear in plain English. The answers generate error-free Filing & Data Entry Programs for you...instantly. This completely eliminates the tedious and time consuming development you normally go through to write a program. Since the instructions are right on the screen you don't need any programming skills to operate Quikpro+Plus. Quickly, you get a fully independent new program ready to run on your system. After you create the new program you can remove Quikpro+Plus and stick it on the shelf until the next time you create a custom program.

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PERFORMS CALCULATIONS...

You can perform all manner of computations among various fields in each record. You can selectively calculate and print resulting data only, or Data Base and results, or alter Records by calculation results, and so forth. The possibilities seem unlimited. And keep in mind that the power and features I am talking about end up in the separate new custom program Quikpro+Plus writes for you.

This software is ready to ship immediately

and you can start writing programs the day you get in. In fact, ICR-FutureSoft guarantees your satisfaction or you can return it for a full refund in ten days after delivery. How's that for confidence? Mr. Tamargo said "There isn't any risk to us...our product works like it's supposed to work and users are very well satisfied. We are glad to guarantee satisfaction."

You get Quikpro+Plus by mail or phone directly from ICR-FutureSoft. Just write them, or call their Toll-Free phones and specify your model and version requirements from the list that follows:

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Software Dealers can handle this software. Contact ICR-FutureSoft Customer Service at 1-904-269-1918 or write

colors on the screen change to match the new palette.

The format for the Color statement in medium-resolution color graphics is:

COLOR [background] [,palette]

where:

background : a numeric expression between 0 and 15.

palette : a numeric expression equal to 0 or 1.

Therefore, the statement `Color 0,1` will immediately color the background black, including the border screen, and immediately change green, red, and brown to cyan, magenta, and white. Only the colors of one palette may appear on the screen at one time in addition to the background color.

PColor demonstrates all the possible combinations of colors on the IBM PC. It begins in Text mode, width 40, with a menu at the top of the screen. The rest of the screen is filled with blocks of each background color embedded with charac-

ters in each foreground color. The characters in each block indicate the foreground and background color values used to obtain that block's particular combination of

EACH
graphics statement
can put one of four
colors on the screen by
specifying the color
number.

colors. The program then cycles through each border color, printing the value used to obtain the border color on line 25 of the monitor. To pause in this cycle for a still display, press [F3]; then press [F4] to resume cycling of the border colors. [F8] dis-

plays in width 80, while [F7] returns the display to width 40. In width 40, you may invert the matrix of foreground/background color blocks with [F5] and [F6]. In either width you may display blinking characters with [F10] or normal (not blinking) characters with [F9].

Pressing [F1] changes the screen to medium-resolution graphics and draws large boxes of each color. Here, too, the program cycles through each background color. To change the palette in this mode, press [F2]. As in the other mode, the values of the background color and of the palette are displayed at the bottom of the screen. The changing background may also be paused and resumed by [F3] and [F4].

While PColor can be especially helpful to those who have color graphics printers, the expense of such hardware makes it a rarity among PC users. This program is not for everyone; but for those who use a great deal of color graphics or who are planning to buy a color monitor, it can be a big help. /PC



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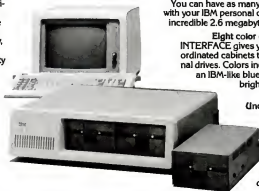
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A Cigar-Factory PC And The VisiCalc Soccer Standings

Rick Hiten has a business in a renovated cigar factory, and Bob Warden keeps tabs on his son's soccer league with VisiCalc.

Early last year Rick Hiten established his own consulting business in Owensboro, Kentucky. As owner and primary staff member of Hiten & Associates, he provides community planning and business development assistance to public agencies and private clients. Since last February he has used an IBM PC to assist him in all of these projects.

In these respects Hiten's situation is not particularly unusual: Many people who have business experience start their own consulting firms, and a number of them have added PCs to their tool chests. Yet few are likely to have installed their PCs in a location as unique as Hiten's—a converted cigar factory that was once the largest wooden building in the world.

Hiten & Associates was the first tenant in the Cigar Factory Mall, a renovated building that won a place in the Guinness Book of World Records. At the time of its construction in 1892 it was the largest wooden building anywhere. Its dimensions were massive, considering the era and the materials used: 81 feet high (seven stories), 60 feet wide, and 300 feet long.

For more than 60 years this huge structure served as one of American Tobacco Company's warehouses. In 1958 the company converted the warehouse into a cigar



Rick Hiten in his office. (Inset top) The original tobacco warehouse, built in 1892 in Owensboro, Kentucky. (Inset bottom) The entrance to the newly renovated Cigar Factory Mall.



age day they made 800,000 stogies. By the 1970s, however, the demand for cigars had diminished considerably, and in 1978 the factory closed.

From Stogies to Stores

Three years and \$2 million later the old tobacco building was given new life by Owensboro developer Robert Moorman. As a community planner for a local government agency, Rick Hiten learned about the renovation project and contacted Moorman, who suggested that Hiten become an independent consultant for the project. Hiten accepted and also became the first occupant of the mall, which now houses a number of professional offices,

restaurants, and retail shops.

Soon after going into business for himself, Hiten realized that he needed a word processing system to keep up with the paperwork. "We write quite a few reports around here," he notes. "I looked at several word processors, but people told me that for my business I needed a computer to do financial planning and other things." He hadn't decided which computer to buy when IBM announced the PC. Hiten made the 30-mile trip to the nearest dealer (a ComputerLand in Evansville, Indiana) to see the new computer, and he liked what he saw. Before purchasing his PC, he returned to Evansville several more times to ask questions and try out the system. He

**ON AN
average day they
made 800,000 stogies.**

factory by demolishing all but the bottom two stories and replacing many of the walls with brick. At full production capacity the factory's 450 employees could turn out 1.2 million Roi-Tan cigars; on an aver-

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found a willing staff that knew about microcomputers but was not yet familiar with the PC.

Learning in Tandem

"Most of the local ComputerLand people got into computers a few years ago and already had their own systems, so they didn't know that much about the PC," Hiten points out. "So we worked through the

**I'D NEVER
worked with a word
processor before, so I
was amazed at what it
could do.**

thing together; we dragged out the technical manual, EasyWriter, VisiColc, and everything. We all learned at the same time."

By the time he took his PC home, Hiten knew many of the computer's basic operations and was well along in learning both EasyWriter and VisiColc. But his considerable practice provided little preparation for the infant mortality that his computer suffered the day after he got it. "I brought it home, plugged it in, booted up EasyWriter, started messing around, and all of a sudden the system went down; the screen just went blank. I didn't know what went wrong. I thought, 'Oh my God, I've done something to it already.' I'd had the machine for only 24 hours."

Of course, Hiten's short-lived experimentation with EasyWriter hadn't caused the problem, but he confirmed that fact after several hours of troubleshooting by the ComputerLand staff. The malfunction turned out to be in the disk drive controller; after a new controller was installed, the machine worked perfectly. In the 9 months since, Hiten's PC has had no further problems.

"I am pleased with the computer's performance," Hiten affirms, "and very satisfied with the help and service I've received from the ComputerLand staff in Evansville." When he ordered a typewriter interface to use with an IBM electronic typewriter in his office and subsequently discovered that it wouldn't print justified

text or perform other printing enhancements, the store allowed him to return the device. (He has since purchased an Epson MX-100 printer.) The ComputerLand salespeople also gave Hiten the names of other PC owners in his area, one of whom has helped him with technical questions that no one else could answer.

Hiten wasn't as satisfied with the original version of EasyWriter, but at first he was unaware of some of the bugs in the program. "I guess it's like the difference between a good bottle of wine and a bad bottle of wine," he muses. "If you've never tasted wine before, how do you know whether one is good or bad? I'd never worked with a word processor before, so I was amazed at what it could do. It was a while before I realized that it wasn't doing things it was supposed to do."

In his work Hiten relies on the word processor and spreadsheet programs. He has also produced accounting and communications software. His system hardware includes 64K, two single-sided disk drives, monochrome display, a NEC black and white monitor that he uses in combination with the color/graphics card, and the asynchronous communications card. Hiten does not use both monitors at once; he changes the DIP switches inside the computer when he wants to use the graphics card and monitor. He also has the D.C. Hayes Smartmodem.

On-Line Research

Hiten's PC system is a business investment. It makes his work more efficient by giving him the capacity to do data base research. The business and planning reports he develops for clients generally include background information and data on a client's specific industry—research he used to do by telephone or at the library. Now he is able to connect to The Source and the extensive data bases of Dialog and gather detailed information that can be integrated into his reports and financial analyses.

Hiten's computer-aided research supplies information instantly and easily. "One client wanted to know if it was feasible to open a store, considering today's economic conditions. I put together a marketing strategy, business plan, and my recommendations for the project. I used The Source to get the economic and marketing background. In the past, I'd call up librar-

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ies and ask for that information; with The Source and Dialog I can take it right off the screen."

On-Screen Training

Hiten has also discovered that many of his clients are fascinated by the PC. When clients come to his office, he often consults their records while they look on. "I've got their records on a disk," he notes. "I pop the information up on the screen and they are amazed."

Some clients want to try the computer for themselves. For a first exposure Hiten puts in a game disk. "The games give an introduction to the computer that seems friendly," he reports. "Maybe they've always wanted to slay dragons or solve a mystery or something. Playing a game makes it easier for them to sit down and do some work the next time." He has also used games to introduce the PC to office staffers to help them get over initial fears of the computer and make learning EasyWriter easier and faster.

Rick Hiten says that he went through his own on-screen training to learn the programs and make the PC a useful business tool. This process was a bit more complex and time-consuming than he had expected, and he suggests that many people may be misled by the stereotypical view that using a computer is effortless. "I guess I believed that all you had to do was buy the computer and it would work by itself. That's not the way it happens."

VisiCalc Meets Soccer

Bob Warden is an engineer who has access to a PC at work. Like a growing number of other people in business and technical professions, he also has a PC at home. Warden often brings projects home. But Warden's life is not all work. A resident of Berkeley, California, he is very active in the East Bay Youth Soccer League. His 13-year-old son, Bruce, plays on one of the league's 85 teams. In addition to serving as a referee for matches, Warden serves on the three-member board that directs the league's activities.

One of his duties is to set up a schedule for two divisions (27 teams) in the league and to keep track of their playing records and league rankings. That's where the PC and VisiCalc come in. This year Warden



Bob Warden on the soccer field.

Photograph: Linda V. Williams

created a schedule and scorekeeping system with the spreadsheet program; his model accommodates all team scores and allows him to calculate each team's division ranking within a few seconds.

Convenient Calculations

"VisiCalc is a natural for such a job," Warden reports. "A soccer schedule comes out in a tabular format, and VisiCalc gives me a convenient way of handling it. I get things justified and formatted right or left, depending on how I want them, without any effort."

Warden devised the schedule to keep track of scores and to calculate team rankings, but first he made up the list of matches by hand. "I had previously worked out the round robin that goes with a certain size division, say an eight-team division, and I put it into the VisiCalc schedule. When the scores come along, I put them in

the PC underneath the appropriate teams, and the computer calculates the number of points each team gets. They get two points for a win, one point for a tie, zero for a loss. Then I keep track of the points to find out who is the division winner. I can just dump it to the printer when we have a league meeting or a meeting of the coaches. There's no effort in staying caught up."

Warden got the idea to use VisiCalc for computerizing the schedule from seeing his colleagues do similar calculations at work. He was familiar with the effort involved in scheduling and scorekeeping because he had previously served as match secretary. "Combining the two was logical," Warden points out. "Having seen what could be done with VisiCalc, I knew that there was a good fit and that it would be useful and fun for the user."

Besides saving time for Warden, the

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VisiCoc soccer schedule assures a degree of accuracy that was not always possible with handwritten scores. "One of the really great advantages is that it's all legible and easy to change," he notes. "It's hard to depend on someone's printing; if you get it all typed up, there's no problem."

Warden notes one drawback in the way VisiCoc handles calculations. "One wishes that VisiCoc had letter variables. The way it is now, I have to say that Team 3 is playing Team 7 and then Team 1. It would be nice to have them playing the Grizzlies and the Avengers. It would add a touch of reality. I could do that now by loading the DIF files into a BASIC program and converting the number into the equivalent name of the team, but that's extra work."

Added Features

Despite this shortcoming, Warden continues to add features to his scorekeeping system. "I'll do other things with the schedule now that I have it. In addition to scores, I'll put in the names of referees at various games so we can keep track of teams that don't provide referees when they should. We can also keep track of disciplinary measures that referees take. There are various degrees of discipline a referee can administer on the field, and when he does, he reports it. If certain teams are creating problems, we can identify them early on."

Warden predicts that at least one other match secretary will come to his home to use the VisiCoc system. He has also made a master schedule, printed copies, and distributed them to other league officials. He plans to take a current printout to monthly league meetings, and he may make printouts every week to tell coaches and players how their teams stand in the division.

At the end of the season Bob Warden's VisiCoc soccer schedule will get a bigger test. He will use it to record scores and figure the rankings for a tournament that will feature 120 soccer teams. The time-saving and instant-ranking features of his program will undoubtedly come in handy. /PC

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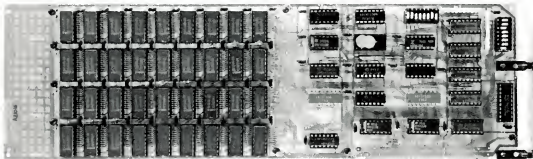
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A computer is only as useful as its software, and selecting software that fits your needs may be a harrowing experience. Along with learning a new vocabulary, read between the lines of product advertisements to determine a package's real power. If you understand the buzz words of software, you can make educated decisions. Applications software is so frequently used by PC owners that some special attention is warranted to assure that you get the right package.

When you look for an applications program, a number of specific features must be considered. Depending on the type of processing and the amount of money you want to spend, different packages may fit your requirements. Parameters to use in comparing them include:

- Languages. Is it in a higher level language, such as C, assembly, or FORTH, that can be moved from computer to computer?

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- Auto boot. Does the program automatically turn on and activate itself when you put the disk in the drive and turn on the computer?

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- Help screens. Do screens of information offer explanations and prompts on specific items of interest so you don't have to refer to the documentation?

- Special function keys. Have special function keys been implemented?

- Quality of manuals. Are the manuals a few xeroxed pages or do they have color graphics and bound binders? Do they meet your needs? Color and typesetting do not necessarily equal quality.

- Tutorials. Is there any source of train-

ing on the applications package? Do you have to train yourself, and, if so, are tutorial materials available or included in the set of manuals that you receive?

- Reference manuals. Is there documentation to customize the software or make it communicate with other software packages?

- Point of sale documentation. Is there reasonable material available for presale decisions?

Often times the only way to evaluate a package is to buy a copy of the manual, and manuals are usually available at a high price. Good presale documentation allows you to make an educated decision as to the applicability of the package to your needs.

Take a chart to the computer store. Make your own ratings (see Table 1). Watch out for packages that don't have the features described in the advertising and never buy a package without getting a demonstration and trying it yourself. /PC

Table 1: A Survey of Applications Software Systems

	Menu Driven	Auto Boot	Prompts	Help Screens	Special Function Keys	Intro. Manual	Tutorials	Reference Manuals	Point of Sale Documentation	Purchaser Comments
Product: <u>Easywriter II</u>										
Company: <u>Information Unlimited Software (IUS)</u>	yes	yes	yes	yes	yes	no	yes	yes	yes	
Price: <u>\$350</u>										
Product:										
Company:										
Price:										
Product:										
Company:										
Price:										

Beyond Beginner's BASIC

A book for the sophisticated reader who has a special interest in learning BASIC.

Programming the IBM Personal Computer: BASIC
Neil Graham
(Holt, Rinehart & Winston, 1982)
287 pages; \$18.95

Another book about programming the PC seems to emerge every second week. Publishers don't want to miss out on the action or the outrageous prices computer books command these days. Some books are better than others, however, and a certain degree of specialization is beginning to appear. This book goes into great detail, uses sophisticated examples, and is written by a professional programmer speaking to less experienced peers or serious amateur programmers.

Graham's is different from many books that chat in a casual voice about programming as an engaging hobby to be enjoyed in one's leisure time. Programming can be that, although most hobbyists find that they have less and less time left for other forms of leisure. Although programming is no longer solely for the professional, it does mean different things to different people, and mass-market programming books are no longer written for everyone.

This book seems aimed at a less naive PC owner than many other books designed to teach the PC's version of BASIC. Some hobbyist programmers may find that the topics are too complex and involved for their purposes. Others, however, will be grateful for a book that offers more insight into the inner workings of BASIC and a more complete presentation of its powers than most books available in this market.

The author is an experienced programmer whose prose is clear and businesslike. While employing a bit of wit, his approach is fundamentally serious. He exhibits the programmer's concerns of not only writing a working program, but writing one that runs quickly and uses a minimum of mem-

ory space. He also discusses program design in greater detail than other books, introducing the concept of structured programming and its procedure for the modular organization of programs.

Graham's approach requires the use of some jargon, however. If words such as algorithm make you uncomfortable, you might avoid this book or use it to overcome your uneasiness, since Graham explains all the words he uses.

I**F WORDS**
such as algorithm
make you
uncomfortable, you
might avoid this book
or use it to overcome
your uneasiness.

A more serious criticism is that Graham offers no solutions to the exercises presented at the end of each chapter. The reader who has nobody to go to for advice will have to write and rewrite the exercise routines until they work. This trial will either teach the lessons well or the reader will form the conviction that programming is cruel and unusual, and give up in a fit of frustration.

Chapters are organized by topics. Each chapter introduces the topics, gives examples and samples that guide the reader through various aspects, and ends with exercises to test the reader's understanding. Sample program lines are printed in large green type as in many IBM PC manuals. Where complete programs are written and analyzed, they are listed in small type but in their entirety. While the book uses very few illustrations, those that are included

seem sufficient, consisting primarily of simple boxes to represent arrays.

The first three chapters cover basics: the three versions of PC BASIC, editing, saving and loading programs, the keyboard, floating point arithmetic, constants, variables, and strings. Graham occasionally refers the reader to PC manuals for information beyond the scope of the book and once or twice points out errors in a manual, such as the first edition of the BASIC manual, which incorrectly says that variable names may be longer than 40 characters.

Unlike many similar books, Graham's attends to the importance of a program's readability as well as its effectiveness. He emphasizes the value of formatting lines of code to reflect their function. For example, when using the WHILE-WEND statement, the words WHILE and WEND should each be placed at the beginning of a line and the code between them indented. Someone reading the code may then see at a glance that these lines form a structural unit within the program. This sort of thing is standard practice for professional programmers, but it is often neglected in mass-market programming books. Although he mentions the use of REM (Remark) statements, Graham does not give them the role they deserve in making a program understandable.

After Chapter 3 programming instruction accelerates. Graham covers the BASIC commands and control structures one by one, in a logical sequence, with examples starting simply and becoming more sophisticated. The author is plainly familiar with PC BASIC, pointing out a bug in the BASIC interpreter and how to avoid it; explaining why the LOC and LOF commands are useless; and noting that IBM prefers housecleaning to garbage collection, a phrase traditionally used by programmers to refer to a procedure in which a computer clears obsolete data from its memory.

Graham goes beyond teaching com-

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mands; he offers tips on programming technique, such as the use of sentinel values in a list, or the need to consider program overhead—the amount of code required by alternate solutions to a programming problem. Conspicuous by their absence in the coverage of BASIC commands are the PEEK, POKE, and CALL commands. This was a curious departure from Graham's usual tendency to be more sophisticated in his discussions. On the other hand, the discussion of techniques for sorting data in arrays may prove a little

TECHNIQUES
for sorting data in
arrays may prove a
little too sophisticated
for the novice
programmer.


too sophisticated for the novice programmer who tries to learn BASIC from this book alone.

In the last three chapters Graham discusses the powers provided by Disk BASIC and Advanced BASIC: disk storage using both sequential and random access files, music, event-trapping (interfacing with external devices such as light pens and game paddles), color displays, and games. The section on the PC's musical capabilities was especially welcome since it is often neglected by other books.

Included is a glossary and an index, which are both fairly comprehensive. On the Cowan Index (number of glossary entries multiplied by number of index entries divided by number of total pages) this book scores 109.

You will not find a better book about BASIC, although you can find many from which it is easier to learn the fundamentals. This book is for those who already know something about programming, have a teacher available when needed, or have an extraordinary aptitude. If you have none of these, remember this book. When you have exhausted your first book on BASIC, this one will provide many hours of learning. /PC

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Writing And Editing With A Word Processor

Introduction to Word Processing
Hal Glatzer
(Sybex, Inc., Berkeley, 1981)
285 pages; \$12.95, \$1.50 handling

Introduction to Word Processing takes the reader through the technical similarities and differences between word processors and typewriters. In the following excerpt, Chapter 6, the reader learns exactly how a word processor functions. Included are descriptions of the control key, the function keys, and the cursor. The chapter concentrates on editing copy, conducting global search and replace, proofreading, and manipulating text.

If you think of an ancient scroll, instead of modern pages, you will grasp an essential concept of word processing. First, unroll the scroll a little at a time, holding the rollers above and below the text: this is the "window" that the CRT screen shows. Now unroll the entire length and hang it up, as from the branches of a tree, at eye level in a circle around your head. If you stand at the center, then pages, paragraphs, headings, etc., are meaningless. What matters is "gestalt," the whole thing at once. Every place in the text is (for all practical purposes) equidistant from every other.

With that in mind, you can understand the differences between word process-

This book is geared for typists who are word processing novices. Readings are meant to alleviate the fears associated with converting from a typewriter to a computer.

ing, which is oriented to the whole document, and typing, which deals with only one page at a time. A word processor lets the user control nearly everything that can happen to a document—in its entirety.

Here are some of the options.



Size of Display

Electronic typewriters and the newest portable word processors show one line of text. Some machines designed for clerical work have six or a dozen lines. The majority of word processors display 25 lines: 24 lines of text plus a line of information, such as margin or tab settings. Some display a full page (i.e., 66 lines), and there are also special-purpose machines which show two pages simultaneously. Full-page displays are useful for visualizing the finished appearance of a letter or other one-page document.



There is a story (probably apocryphal) that some vendors tell. A word processor with a 25-line CRT display was installed in the headquarters of its world-famous manufacturer, and a secretary was learning to use it under the eagle eyes of her boss. He stood over her shoulder peering at the screen and complained—loudly—that he couldn't read it. A nearby engineer ran back to his lab and emerged with a full-page CRT display. This pleased the boss. He told the engineer to make sure all of the company's word processors were built that way, and he presented the prototype to his secretary. She thanked him but—privately—told the engineer that the full-page display was distracting; her eyes could take in only a few lines at a time, and

that was enough.

Color of Display

Most word processor displays are monochromatic: white, green or amber letters on a black screen. Some reverse the image to project black letters on a white background, simulating the appearance of typed pages. True color TV is more expensive to build and has so far proved valuable mainly in graphics applications. Color TV resolution is typically not as crisp as black and white TV. This may change in the future but, for now, color is not offered in word processing. The choice between white, green and amber is purely personal. Proponents of green and amber claim that they are easier on the eyes.

Shape of the Letters

The text you are reading was set by a typesetting machine from an alphabet in which each letter is of the same font or style. When word processing spun off from data processing, it was not always convenient to rewrite the software that controlled the shape of the displayed letters; thus, some terminals use fonts in which letters with "descenders" (those hanging parts of a g or p) are moved up within the line. People who are accustomed to typewriting will find it annoying to read undescended letters. Although most printers type normal letters, screen displays without them can frustrate operators and make proofreading on the screen slow, if not difficult.

Glare and Viewpoint

You can't watch TV in the sunshine. Bright overhead lights and picture windows compete with the CRT display. Since manufacturers can't control where the system will be installed, most screens are laminated with a textured film to minimize glare. Tilting the screen may also cut down glare.

Typewriters are often placed on desk-extensions or small tables that are lower than conventional desks. Although the height of the keyboard is also important with word processors, care should be taken so that the CRT screen is not too low for easy viewing. If a terminal will be used by more than one person, it should be adjustable in order to accommodate each operator. In some models, the keyboard may be adjusted separately from the screen or even detached from the screen. There is

no engineering reason why the keyboard has to be bolted to the screen; a cable can carry keyboard signals to the central processor which, in turn, communicates with the screen. If this flexibility is desirable in your situation, it is worth the extra price of such terminals.

A WORD processor lets the user control nearly everything that can happen to a document.

The Keyboard

The Selectric is only 20 years old, and its popularity has not diminished. As any secretary will testify, the keys make a very satisfying "click" and were carefully designed to be comfortable. Not surprisingly, word processing manufacturers have tended to mimic the Selectric keyboard. Computer terminal keyboards may be made flat, silent and waterproof for unpredictable environments, such as factories or military installations. But those that era used for word processing are as typewriter-like as possible. It is not necessary, from an engineering standpoint, to have a key ride down a quarter-inch under a finger's touch and make a noise when it contacts the bottom. But that response is so much in demand that no word processor has been successfully marketed without it.

The Keys

The standard typewriter, with its "QWERTY" layout is the default option for most word processors: anything different is a special order, such as keyboards that have special characters for foreign languages and scientific or mathematical notation. But aside from the alphabet and number keys, hardly any equipment is standardized, and some familiar keys have unfamiliar functions. There is frequently a REPEAT key or, to achieve the same effect, some keys may generate repeated characters if they are held down, similar to the SPACE bar on many electric typewriters.

The SHIFT LOCK Key

In addition to the SHIFT key (for capital letters and the symbols above the numbers), many word processors have a SHIFT LOCK, also called a CAPS LOCK key. Usually, such keys only affect the letters—not the numbers and punctuation marks. This is convenient to computer programmers, whose style includes commands written in capitals but which also includes many numbers. However, for other users, it is occasionally frustrating to look back and see, for example, 9s and 0s where parentheses were desired.

The RETURN Key

The carriage RETURN key is also different from that of a typewriter. Since word processors wrap words automatically (carrying them to the next line if they will not fit within the right margin), it is not necessary to hit RETURN at the end of each line. Doing so may complicate reformatting the text with, for example, new margin specifications. On practically every word processor, RETURN is a mandatory line-feed and return to the left margin, which is desirable at the end of a paragraph but not within it.

This is an example of what happens if a RETURN command is allowed to interfere with the word processor's tendency to wrap words automatically: truncated lines and some sacrifice in legibility.

The CONTROL Key

Some word processors use a key called CONTROL (or CODE) as a kind of SHIFT key. Instead of changing the letter typed, it changes the very function of the key itself. Holding down the CONTROL key and simultaneously pressing another key produces a specific word processing function. It may, for example, move the cursor in a defined direction (up, down, left, or right) for a defined distance (e.g., one character, one word, or one line).

The use of CONTROL-key combinations to achieve word processing functions is very common; it allows word processing software to be run on the thousands of terminals that were built for data processing

and that, therefore, have no extra keys reserved for word processing functions. When stand-alone word processors were designed, the target user was presumed to be non-technical, so many manufacturers put control over cursor movement, as well as other word processing functions, into unmistakable, single-purpose keys. This greatly simplifies training and operating. But a price is paid in the cost of the terminal: special-purpose keys work because enough intelligence is built into the terminal to handle them, and intelligence is more expensive than ignorance.

Learning to use CONTROL-key combinations may take time and practice, but experienced typists do not mind using them. The CONTROL key is almost always located next to the CAPS LOCK or SHIFT LOCK key, and that enables the typist to maintain the "home" position of the hands, which is best for touch-typing.

Function Keys

Stand-alone word processors and intelligent terminals do not rely on CONTROL-key combinations to perform word processing functions. They may have as many as two dozen function keys which act on the computer directly. Cursor-movement keys are one example; most of the editorial functions that are described in this chapter are also available as function keys. Unless a person has had a lot of

computer experience and enjoys the flexibility that CONTROL keys offer, he or she will almost certainly prefer to use function keys. Having one button for inserts, another for deletions, a third for scrolling forward and a fourth for scrolling backward, etc., makes it easy to learn word processing. Even after months or years, a writer will enjoy the feeling of control that comes when a single keystroke changes a piece of text. It is a paradigm of computer power.

Low-priced word processors, and some microcomputers, may change the function of a ten-key numerical pad. The 8, 2, 4 and 6, for example, may become the cursor-movement compass, with 5 as HOME (i.e., the upper left corner). The 7, 9, 1 and 3 keys may be used for inserting or deleting.

On other machines, a row of keys that are engraved with specific functions may be installed above the top row. These may also be modifiable: software may allow a vendor (or an operator) to customize their operation. In such cases, the keys may simply be engraved with a function number, and the specific utility of each key, as defined by the software, is identified by a stick-on label or a strip of paper.

The CONTROL key may be used to multiply the number of functions. For example, a machine that has 20 function keys may recognize a second set of functions for each key when the keys are used in



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combination with CONTROL, and a third set when used in combination with SHIFT. Sixty separate functions are thus performed by 20 keys.

The Cursor

On a typewriter, text originates in one place only: where the key strikes the paper. The carriage moves the paper left, away from that spot, to accommodate the next letter. A Selectric reverses that procedure, sliding the typing element to the right along a stationary carriage.

On a CRT word processor, text originates at the cursor. The cursor may be a box or an underscore line, it may be reversed-out (black on white) or it may blink, but it is unmistakable on the screen.

It is hard for some people to get used to a word processor because the words appear directly in front of their eyes, rather than down near their finger tips. Touch-typists have less trouble with this, and most users become faster typists with a word processor because they don't have to look down.

Some people say that they are distracted by seeing words appear one letter at a time, left to right, instead of seeing them peel off from a stationary point as on a typewriter. But most people get used to it quickly. At least one manufacturer simulates a typewriter by generating all text on a single line near the bottom of the screen and inching each completed line up the screen when it is full.

WORD processing manufacturers have tended to mimic the Selectric keyboard.

Cursor Positioning

As the example of the scroll showed, the cursor may be moved anywhere in the text. To reach the beginning or the end (often called the top and bottom) of a document, or any other designated place, there are usually special-purpose keys or commands (see the discussion of function keys). Once a document is paginated,

some word processors offer a way to go to a specific page on command.

Specific functions designate keys for moving the cursor around any given page: up, down, sideways, or HOME. On many machines they are separated in some way from the alphanumeric keys. When single-purpose keys are used to move the cursor, they are usually labeled with arrows that indicate the direction of cursor movement. One machine uses a touch-sensitive plate and others use a joy-stick to move the cursor.

Word processors or terminals that do not have single-purpose function keys move the cursor by means of CONTROL-key combinations. In some software for microcomputers, the "compass" of cursor movement is the diamond-shaped layout of the E, S, D and X keys. CONTROL-S moves the cursor one character to the left; CONTROL-D moves it one character to the right; CONTROL-E moves it up one line; CONTROL-X moves it down one line.

In some systems, the cursor may also be moved forward to the first character of the next word, sentence or paragraph by function keys or by CONTROL-key combinations. The compass keys, together with a CONTROL or function key, may also perform extra tasks: moving the cursor directly to the right or left margin; to the top-left or bottom-right of the screen; to the center of the screen; or to the beginning or end of the file. The cursor may be moved continuously by holding down the desired cursor-movement key, or by pressing it in conjunction with a separate REPEAT key.

Menus and Commands

Word processing programs that use CONTROL-key commands may be run on virtually any terminal, but they require operators to learn many extra things in addition to basic familiarization with the equipment. To overcome this problem, such programs typically display menus on the screen that list all of the possible CONTROL-key commands.

So-called menu-driven software is very common. Even in systems that do not require CONTROL keys, the operator is frequently given a choice of activities: edit, print, store, purge, etc. This is vital if a word processor will be used by a variety of people under differing circumstances, or if tasks must be undertaken that would

otherwise require specialized knowledge, such as typesetting or telecommunication. Menu-driven software is very popular; it is one of the hallmarks of user-friendly systems, making them as easy as possible for untrained people to use.

Command-driven software, on the other hand, starts with the idea that you already know what you want. If you eat at a different restaurant every day, you will always need to read a menu. If you only eat at one restaurant, you will be able to give

A WRITER
*will enjoy the feeling
of control that comes
when a single
keystroke changes a
piece of text.*

the waiter your order as soon as you are seated—you may even call ahead to order and your meal will be waiting for you when you arrive. In the same way, command-driven software is faster to use. Moreover, there are some technical advantages; just as menus occupy space on the screen that could otherwise display text, so they also take up space within the computer's memory. Without menus you can process longer texts at greater speed, or you can use editing and printing programs that are larger and thus more versatile.

The choice is optional only in mini- or microcomputer software. Stand-alone word processors offer some combination that uses menus at the start to select possible tasks, with those tasks directed by commands. Well-written menu-driven software often permits experienced users to suppress some or all of the menus, allowing the user to directly issue commands without waiting for a menu to appear on the screen. Thus, more text can be displayed on the screen and some time will be saved. With such an option, menu-driven software may be preferable to command-driven software. But the choice, if available, should not be made until both approaches have been tried. Programming is still more of an art than a science.



and no two approaches to word processing are identical.

Command Sequences

On most mainframe or minicomputers, the CONTROL key is not available for word processing operations. Instead, commands must be issued to tell the computer what to do. These are usually a sequence of characters that are embedded in the text and, therefore, they must be distinguishable from the rest of the text. A punctuation mark immediately followed by a letter or group of characters is often used. In one system, "p" means "start a new paragraph" and ".sp1" means "initiate single-spacing." In another "—fd" means "delete six characters to the left of the cursor." Although they are clumsy compared to function keys, command sequences are versatile and modifiable by the software. In any case, they are required if a large computer is to be used for word processing.

EDITING

Once text is written, it will probably have to be modified. Even touch-typists make mistakes—the success of "correcting" Salectrics is proof. Original material is usually created on a typewriter in stages: writing the first draft, striking over unwanted material with an X (or with a pen), squeezing fresh text between the lines, making marginal notes to connect para-

graphs or pages, and then retyping a second draft. That version is edited for content and style, then retyped. The final draft must be free of spelling or typographical errors.

All of these procedures are automated or placed under the writer's control by a word processor. To accomplish them, the machine responds not only to the alphabet and number (alphanumeric) keys, but also to keys which issue commands. Pushing hardware buttons may be deceptive; the real work is done by the software.

Before the expression word processor became popular, such software was called a text editor. Today, this phrase is reserved for software that is mainly oriented toward editing computer programs. Many of the word processing software packages for mainframe and minicomputers are actually text editors; they are very powerful for editing programs but may lack some of the features of true word processing software. If a text editor has all the features that you need, then by all means use it.

Corrections

Most word processors take the overwriting approach: replacing the character under the cursor with another, then moving the cursor one space to the right. On some equipment, however, it is necessary to issue a command or press a special key that tells the computer that you want to over-write rather than insert.

Line Numbers

Mainframe and minicomputers frequently number the lines in a document; this reflects the software's development from programming, where line numbers are absolutely essential. On such machines, it may be necessary to specify the line number that you want the cursor to enter in order to make a correction. The line numbers can be suppressed when the document is printed. At the beginning of an editing session, when a document is first created, some of these systems may also require the user to tell the computer the maximum number of lines which that document is expected to occupy. This helps determine where, internally, the document will be stored for greatest efficiency, but since it is difficult to estimate that size beforehand, users typically call for much more than they need.

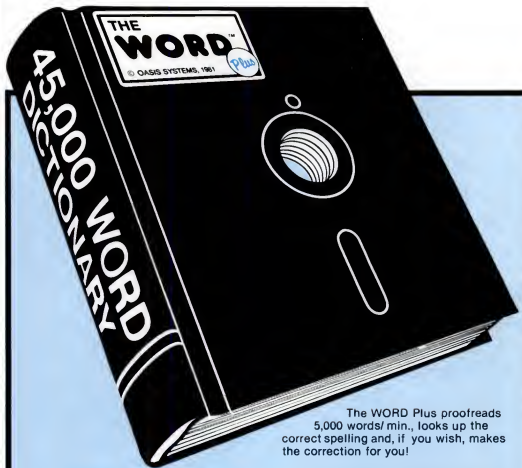
Insertions

Like snowflakes, insert procedures are rarely alike. In many machines, the writer moves the cursor to the place where an insert will begin, presses a function key, and then types in the new material. It is usually necessary to press a second key (or the INSERT key again) to signal the end of

M_{ENU-}
*driven software is
very popular; it is one
of the hallmarks of
user-friendly systems.*

the insert. Word processing software for mainframes and minicomputers may require a command sequence such as ".i" to signal the start of an insert. In very user-friendly stand-alone systems, pressing the INSERT key generates a message on the screen (such as "INSERT WHAT?") as the text opens to receive the inserted material.

A distinction may be required between inserting a few letters or words (character insert) and inserting larger blocks of text (line insert). This happens when the insert function itself is subordinated to the text wrap and paragraph reformation. When



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you type new characters in the character insert mode, the text line is pushed ahead, frequently forcing a new wrap to the left margin. If software is not written to handle this, or if the available scratch-pad memory is too small, the word processor may lose some of the text—usually what's being inserted. Fast typists complain bitterly about this, since they may be able to "out-run" the machine; it happens even on expensive equipment. Consequently, an alternate insert mode may be used that splits the text at the insert point. Text to the right of it may be taken off the screen entirely, or a line or a few words may be left at the bottom. This way, any amount of new text may be written at any speed; the wrap and reformation will not be done until the insert is completed. Good software offers both modes because of the trade-off: line inserting takes more time if only a few characters are needed.

Deletions

When you SPACE over a letter, you substitute a blank character; when you DELETE it, you remove it from the text and the word processor closes up the line like the sea closing over a sinking ship. As with inserting, it may be necessary to choose between deleting a character, a word, a line, several lines or even pages.

A CONTROL key, a function key or a command sequence will initiate the action, which nearly always begins at the cursor. The simplest method deletes whatever is under the cursor; another press of the key deletes what has slid under the cursor after the first character is gone. Moving the cursor generally does not wipe out what it passes over; rather it interrupts the DELETE function, which must be restarted when the cursor has been placed over some other unwanted material.

On stand-alone machines a message may appear ("DELETE WHAT?"), and when the cursor is moved, the material to be deleted is then highlighted or underscored in some way. A second key (sometimes called EXECUTE) may be required to actually delete the "condemned" text. Sometimes the text is identified not by moving the cursor, but by typing the character which appears at the end of the unwanted text. For example, if the DELETE mode is selected, and the character "." is typed, then the cursor will move to the next appearance of the period (usually the end of the current sentence) and thus pre-

pare the text up to that point for deletion. This may be automatic, even if the text is wrapped onto another page, off-screen.

Word processors may distinguish between character, word and line deletion with separate CONTROL keys or function keys. On some, the deletion may be direct-

EVEN
touch-typists make
mistakes—the success
of "correcting"
Selectrics is proof.

ed to the character under the cursor, or to the character to the right or to the left of the cursor. A whole word may be deleted with one command, but it is usually the word to the right of the cursor. A line or more can be removed with the appropriate keystroke and accidental erasure is possible. To guard against accidental erasure, word processors may require the following:

- a second pressing of the DELETE key
- pressing a second key, such as EXECUTE
- a response from the operator to a message displayed on the screen, such as "Please confirm that ____ characters are to be deleted: Y/N"

On a few machines, deleted material is held in a scratch file. This is a boon to first-time users and experienced typists alike; everyone makes mistakes. Recovering lost text is a powerful option, but not widely available since it takes up valuable memory space. When it is available, it is usually limited to holding the last deletion only.

Manipulating Text

A piece of writing reaches its finished state by experimenting, adjusting and fine-tuning. Insertions and deletions imitate the editor's blue pencil, but word processing reaches its true potential in "cutting and pasting." To move whole sentences around, to rearrange the order of paragraphs and pages, or to pick them up and move them intact to another document is the power that electronics gives a writer. The approaches vary, but the technique is standard: identify the text, identi-

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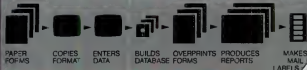
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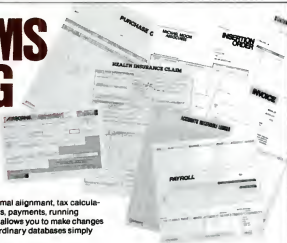
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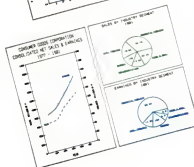
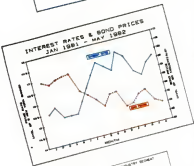
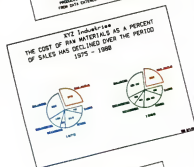
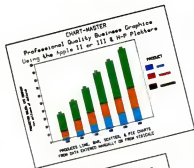
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fy its destination, and move it.

Usually the cursor is placed at the beginning of the text that will be moved. On some machines, the "beginning" must be the beginning of a sentence or a paragraph. Pressing a function key or CONTROL-key combination labels the text in some way, both internally to the computer and externally to the user, by highlighting it on the screen, for example. Other systems require a marker of some kind to be placed at both the beginning and the end of the block of text to be moved.

The sequence may be reversed by some machines: the function is called up first (MOVE, CUT, etc.), and then the portion of text is identified. On mainframe or minicomputers, a command sequence may be required (for example, "m" for "move") to tell the computer what to do.

The text will either remain on the screen or be taken off to a scratch file while the writer searches for a place to put it. Every good word processor will permit text to be moved anywhere within the document that it came from, or into any other document on the same disk—if there is room. When the cursor is at the desired place, the writer presses another CONTROL key, function key or command sequence (EXECUTE, PASTE, ".x", etc.) and the text is rewritten there.

A similar procedure is used to copy text, such as addresses on labels, boilerplate paragraphs in a form letter or contract, and so on. The CONTROL key, func-

THE WORD processor closes up the line like the sea closing over a sinking ship.

tion key or command sequence differs, but the operation is the same.

When the text is moved or copied to another document, it may not necessarily take format instructions with it, and the moved text may have to be reformatted according to the shape of the text into which it is placed. For example, a verse of poetry, which has line breaks that must be kept intact, will require special attention.

Glossaries or Lexicons

On some systems it is possible to store short phrases in a glossary (also called a *lexicon* or *include file*) for swift recall. A return address, standard letter closing, etc., may be needed often enough that it is easier to type a couple of keystrokes to call it out of storage than to rewrite it from scratch each time.

A function key or CONTROL-key sequence is usually required to enter the glossary. The phrase is typed in and assigned a number, acronym or abbreviation (e.g., GL2, ADDR, CLOSE). Then, when it is needed for inclusion, the writer enters the glossary and requests the phrase. It is copied into the text at the cursor position.

A limit is almost always placed on the number of characters or lines in any single glossary entry. Also, the format of the entry is fixed. If your return address is entered single-spaced, with underscoring and line centering like this:

Mary Jones, President
Ultimate Broadcasting Company
12000 Hollywood Blvd.
Los Angeles, CA 99999

then it will not automatically fit in a double-spaced letter where you want it to run on one line (Mary Jones, President: Ultimate Broadcasting Company, etc.). For each potential format, a separate entry would be necessary and the writer must keep a list of glossary numbers or mnemonics in order to remember which represents each entry. Fortunately, many systems also provide scratch files (often called HELP or DIRECTORY) that will keep that information handy.

Search, Global Search, and Replace

Starting at the beginning of this article, find the first occurrence of the word "computer" and replace it with the phrase "electronic digital calculator." Then find each succeeding occurrence, and do the same. If "computer" is underscored, leave it alone, but if it is capitalized, then capitalize the first letter of each word in the new phrase.

What's the matter? Afraid of a little hard work? Word processors do this all the time. When you enter the search mode with a function key, CONTROL key or command sequence, the CRT will display a message ("SEARCH FOR WHAT?") or a

symbolic prompt. Type in the character, word or phrase that you want to find, and press RETURN, EXECUTE, or whatever key sequence activates the search. The duration of the search depends on the length of the file, the capacity of the disk, and the

EVERY GOOD word processor will permit text to be moved anywhere within the document.

speed of the CPU; the computer may generate a message ("SEARCHING") to show you that it is not out to lunch.

If the word is found, the text will scroll to it with the cursor poised for action. On some systems, a search may be undertaken either forward or backward through the text, but on most systems a search proceeds in only one direction—forward from the place where the cursor is. If the whole document must be examined, move the cursor to the beginning of the text before starting the search.

When you want to find every occurrence of a string of characters in a file, the process is called global search. This is a good way to check for errors, as when you have written "Main Street" instead of "Elm Street." Ask the system to find each occurrence of "Main Street," so you can decide if it should be changed.

In a book about American life, for example, the words "Main Street" may occur almost anywhere. They may begin a sentence, or they may—as in this example—be enclosed with quotation marks. Word processors (being computers) are very literal; you must be explicit about which occurrences of "Main Street" you want it to find. Some systems permit you to find only occurrence: capitalized, hyphenated, underscored, etc. Others require that you make a separate search for "Main Street," "Main St.," "MAIN STREET," etc.

If you decide to change "Main Street" to "Elm Street," the computer will do it for you. Enter the replace mode in a manner similar to entering the search mode. In some systems, there is a single search and replace function. In others you must call

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up each function separately. Initiate the replacement process by the appropriate function key, CONTROL key or command sequence and type in the replacement text ("Elm Street"). The word processor will find each "Main Street" and hold it up, in context, for your consideration. It will request some kind of confirmation from you before changing it to "Elm Street."

If you are sure that every occurrence of "Main Street" is incorrect and that they should all be changed, there is no need to go through the text yourself. Using global search and replace techniques, instruct the word processor to change every "Main Street" to "Elm Street" automatically, and sit back and let the machine do the work. Be careful, however. The machine may change "main street" to "elm street" in this sentence: "Broadway is the main street in New York."

The search and replace operation can get tricky because computers are literal to a fault. If you want to change every occurrence of "he" to "she," it is wise to identify the original as "SPACEheSPACE" (" he ") and the replacement as "SPACEsheSPACE" (" she "). Otherwise, you will have to correct such lines as:

"Wshere is tshe tshearer?" she asked tshem.

"Share!" tshey cried.

There are many applications for this power. Spelling conventions (such as "colour" for "color") can be observed in documents intended for readers in different countries, each receiving the home-country spelling. An editor can mark up a printed draft with blue pencil and then go directly to the desired sections of text—bypassing the rest—to edit it. Indexes are easy to construct by searching for all occurrences of a particular word or phrase and noting its place or page. Tables of contents can be built using the search mode to find headings, sub-heads and chapter breaks.

Proofreading

A calculator cannot vouch for the accuracy of the numbers it is "crunching" and a word processor cannot spell any better than the writer using it. If you type "hte adress," a word processor will wrap it, store it and print it exactly as you typed it—completely unaware that you meant "the address."

Spelling and proofreading programs are available, some of which are designed

to work with microcomputer word processing software and others which are sold as a package for stand-alone systems. As a rule, such a program includes a list of words and an algorithm (formula) for comparing every word in your document with every word in the dictionary. However, there are many ways of accomplishing this.

In some programs the dictionary is small, with only the root words and a few rules in the algorithm for prefixes, suffixes and plurals. This is a fast and generally efficient technique, since "computer" and the suffix "-ize" can be combined to produce "computerize" without having that word itself in the dictionary. But there is a drawback: will it accept "computerly" or "computering"? And what about "mooses"? The plural of "moose" is "moose"!

In other programs, particularly those which are built into stand-alone systems, the dictionary is large and the algorithm searches through it for a word closest to a mismatch from your text. If you have typed "myonnaise," the program will suggest "mayonnaise" and may—in some systems—actually correct your text by replacing the word for you. This seems to work well, but caution is advised. If you typed "soarse," did you mean "source" or "coarse"? And if you want your printed text justified, changing the spelling of "myonnaise" to "mayonnaise" will add two letters to the line it's on; will that throw off the justification?

SIT BACK and let the machine do the work.

Both of these algorithms work well, but other algorithms require greater concentration on the writer's part. In those, when a word is not found in the dictionary, it is copied into a scratch file and displayed to the writer after proofreading is completed. Then the writer determines whether it is a one-time word, such as a proper name, or a spelling or typographical error. If it is an error, the program will return to the text and mark the word in some way—typically, by changing the first or last character to

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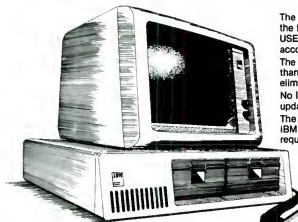
an exotic punctuation mark: "adress" becomes "adres*". Using the word processor's search mode (i.e., search for all occurrences of "**"), the odd words can be located in context, and changed as required. Naturally, this takes longer than automatic replacement, but it gives the writer full control over the text.

A WORD processor cannot spell any better than the writer using it.

In most of these proofreading programs, there is a way to add words to the dictionary. The original dictionary may contain 10,000, 20,000 or 50,000 words, but English alone contains over 100,000 words, and some professions use an additional vocabulary of Latin, medical, or scientific words. A good proofreading program should make it easy to add words, or to create new dictionaries. An attorney, for example, may add about 1,000 legal terms to his main dictionary, and then create a second dictionary for clients' names and street addresses. A chef who is writing a cookbook can have a separate dictionary so that, for example, "au jus" will not be proofread against "at" and "just." A teacher who is writing textbooks for new immigrants may streamline her dictionary to 10,000 basic English words, so that the books will not contain words beyond her students' grasp.

All proofreading algorithms have two inherent limitations. Hyphens are a problem whether they are ignored ("son-in-law") or accepted ("imagin-ation"). The best way around this is to proofread the text before formatting. The other problem is that no algorithm will catch an error if the misspelled word is the correct spelling for another word ("this" instead of "thus"; "if" instead of "of"; "so" instead of "to"; etc.). There is no substitute for sitting down and reading the whole thing yourself. /PC

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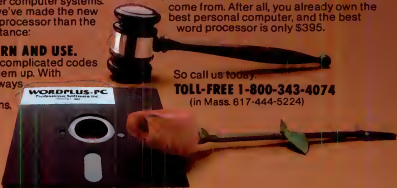
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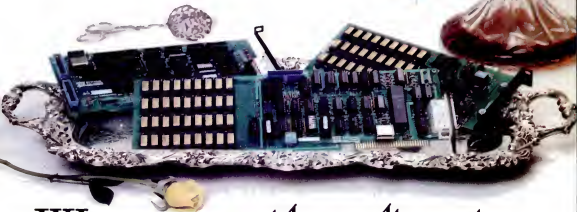
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The Strange Case Of Eddie Smith

Part Six.

The personal computer traces its roots back to the Altair computer, first manufactured in January 1975 by MITS, Inc., a small company that came from the desert sands of Albuquerque, New Mexico. For the next 2½ years, MITS, Inc. so dominated this new-found market that the company literally defined personal computing. David Bunnell and Eddie Currie were both uniquely involved in the beginning of personal computing as MITS' vice presidents. Together in this exclusive series they tell the story of The Age of Altair.

Life at MITS was never dull. Each day brought new events and unexpected visitors. The MITS staff had become fairly adept at judging the motives of some of these visitors. One group from San Francisco came to discuss an OEM agreement for Altairs. It wasn't long before the marketing department discovered that this was only a ruse to obtain Altairs at a discount, and the guests were sent on their way. Discouraged, but determined, the visitors retreated to safer ground in the West and decided to manufacture their own "boxes" to be incorporated into systems with software they had developed. At one point someone suggested that they forget the software and just sell the boxes. Thus Imsai was born. With an advanced Altair-compatible computer, the company challenged MITS for the micro crown.

One day Dr. Currie was summoned to appear before Ed Roberts, the supreme commander of MITS, known covertly as "The Big Fromage." "Sit down," said the

Fromage with a wry smile. "We may have our first serious personnel problem."

Apparently someone had applied for a job in the shipping department and was told to call back in a day or two. Impatient to see if he was hired, the applicant called the next day and was told that he was unqualified. When he asked for a reason, he got three. First, he was too old. At 31 he was considered a candidate for the old folks home. Secondly, he was too well-educated. Two years of college overqualified him for the shipping department. The third strike against him was his marital status: being married was unforgivable.



Illustration: Stuart Bradford

The applicant couldn't believe it. It seemed the shipping department was looking for illiterate children who were capable of living on minimum wage. Flabbergasted, he did what any red-blooded American would have done. He filed a discrimination charge with the appropriate federal agency, and the Feds came knocking on Ed Roberts' door.

"So what do you think we ought to do?" asked the Fromage. Dr. Currie thought for a few moments and said, "Why don't I interview him. Perhaps we can use him elsewhere in the organization." "Okay, let me

know what you decide," Roberts replied optimistically.

Dr. Currie returned to his office and instructed a secretary to contact the recently spurned applicant and invite him back for another round. The next day a well-mannered, handsome man appeared and introduced himself as Eddie Smith. Following a short interview, Dr. Currie was suitably impressed and offered Smith a job as his personal assistant. The surprised young man, who thought he was applying for a job in the shipping department, asked, "Exactly what are my du-

ties?" "Well, your first assignment will be to handle the case of MITS vs. Smith and all the associated paperwork," replied Dr. Currie as he walked out the door.

Once the machinery of government starts moving, it is very difficult to halt it. In the weeks ahead, Mr. Smith was to fill out a myriad of government forms, arrange for interviews by the government investigator assigned to the discrimination case, and prepare documents for MITS' counsel.

Finally the day of the hearing was at hand. Mr. Smith appeared promptly and introduced himself as the complainant in the case. When asked who was to represent MITS, Mr. Smith proudly announced that he was the authorized representative of MITS in these proceedings.

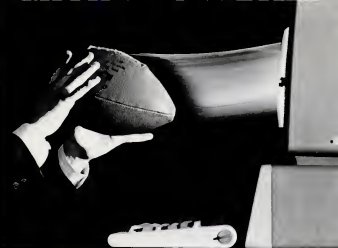
S **SMITH DID**
what any red-blooded American would have done. He filed a discrimination charge with the appropriate federal agency.

The room was silent. The federal investigator threw down his papers in disgust and grabbed Smith's arm. "Mr. Smith," he hissed, "we feel like you've changed sides on us!" Eddie shrugged and the case continued. The hearing officer asked, "What does the representative from MITS have to say about the charges brought by Mr. Smith?"

Eddie stepped forward and said with nary a smile, "Well sir, I called myself into my office and asked myself, really asked myself, 'Mr. Smith, are you sure that you want to proceed with this complaint?' After a few moments of reflection, I told myself 'No.' Therefore, as the authorized representative of MITS, I hereby request that this charge be dismissed, and as the complainant, I second the motion."

Ed Smith left the hearing room and returned victoriously to MITS. He could hardly have done otherwise. As Dr. Currie's assistant he would play a key role in future episodes of the Age of Altair. /PC

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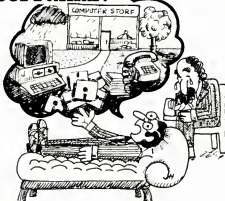
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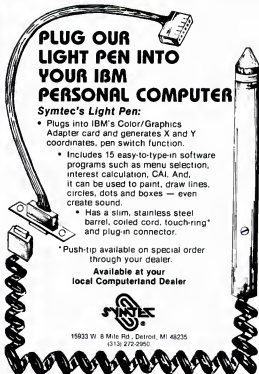
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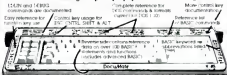
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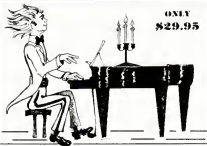


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Presenting A 16-Bit Christmas

A collection of Christmas ideas, gifts, and suggestions for PC users and those who wish they were.

SOFTWARE

Christmas Sampler

If someone in your family can't be separated from the PC even though it is a holiday, this program can bring Christmas to the computer. It uses full-color graphic animation and sound to depict the stories *The Night Before Christmas* and *A Christmas Story*, plus a selection of carols. Screen texts to allow younger children to read along are also included. (List Price: \$29.95)

Requires: 48K, one disk drive, (color monitor recommended).
Spinaker Software
26 Brighton St.
Belmont, MA 02178
(617) 868-4700

MailMerge

When the elves need to be given all the different Christmas lists Santa receives so they can make everyone's gifts, Santa saves time with a program that can join each elf's name and address to a particular file of gifts to be manufactured. It isn't likely that anyone you know has the good fortune of having elf labor, but things would be much easier if he or she owned a program like the one Santa Claus has. MailMerge is a file-merging program used with WordStar to perform word processing projects such as personalized form letters, invoices, and mailing labels. It can also boiler plate legal documents from a variety of standard paragraphs. (List Price: \$150)
MicroPro International
33 Son Pablo Ave.
San Rafael, CA 94903
(415) 499-1200
Telex: 340-388

As Christmas approaches, picking out gifts can be difficult, especially for those individuals who don't leave copies of their lists where you can "accidentally" find them. You won't have to resort to subterfuge to extract gift wishes if they are owners of an IBM PC. As we demonstrated in the September issue, more than 1,250 products are available to support the PC.

To help you choose gifts this Christmas, we have drawn up our own list, which includes products that would be suitable for any PC owner. When choosing a present, keep in mind the receiver's needs and interests.

254 rows. All values or formulas in this grid may be modified, and the program automatically recalculates the entire worksheet, using the new values. Cursor control keys permit scrolling in all four directions, and the screen may be divided into two windows to view different sections of the worksheet at once.

VisiCalc is also distributed by VisiCorp as one program in an integrated "VisiSeries." (List Price: VisiCalc by VisiCorp \$250; VisiCalc by IBM \$200)
Requires: 64K, one disk drive, 40- or 80-column monitor, (printer optional).
VisiCorp
2895 Zanker Rd.
San Jose, CA 95134
(408) 946-9000

PC/FORTH

A language for graphics, data acquisition, and process control applications. The complete package includes an interpreter/compiler with virtual memory management, a custom full-screen editor, an 8088 assembler, utilities, demonstration programs, and a 150-page user manual. Optional extension packages for floating point math, advanced color graphics, data base management, and target compilation are also available. (List Price: \$100; extension packages \$100 each; data base management \$200; target compiler \$300)

Requires: 84K, one disk drive.
Laboratory Microsystems
4147 Beethoven St.
Los Angeles, CA 90066
(213) 306-7412

VisiCalc

No one will be accused of being a scrooge for having an efficient multipurpose forecasting and planning program. In fact, it might save enough money to buy Bob Cratchit a goose. With this software package for account-

ants, analysts, and business planners, users create and manipulate an electronic worksheet of up to 63 columns and



Christmas Sampler, Spinaker Software

A 16-Bit Christmas

Multiple Finance

Christmas gifts needn't be given to individuals; they can also be given to cities. If you have a favorite city in mind, this series of four programs performs the analysis necessary to structure municipal bond issues. It is designed for investment bankers and financial advisors who prefer on-site microcomputer analysis to off-site time-sharing with large computers. (List Price: \$11,600)

Requires: 128K, two disk drives, serial interface, printer.
B.A. Nicholson & Company
271 Madison Ave. #1007
New York, NY 10016
(212) 889-7535

Pixprint

Any graphics picture (medium- or high-resolution, black and white or color) can be printed

with this program. Colors are translated into shades of gray. It prints four different sizes, from playing card format to full-blown poster-size graphics without a graphics video board, from a picture stored on disk.

(List Price: \$49.50, \$57 Conodoy)
Requires: 48K, one disk drive, Epson or IBM printer with Graf-trax.

Microtours Inc.

299 Rideau Terrace #706

Ottawa, Ontario

K1M 0Z3 Conodoy

(613) 745-6661

Datebook II

While counting the days of Christmas, a friend may receive a partridge in a pear tree and a number of other gifts, but he or she may also neglect a number of appointments amidst all the holiday activity. This program

helps professionals organize and remember their appointments during the busy holidays and the rest of the year. It is an on-line appointment book with a menu-style display that allows appointments to be scheduled, canceled, modified, moved, or held for rescheduling. Users can search for openings by time of day, day of the week, or day of the year, and display appointments for any person, schedule conferences, or print out the day's appointments. (List Price: \$295)

Requires: 128K, one disk drive, UCSD Pascal or CP/M-86, 80-column monitor, home and clear functions, (printer optional).
Software Digital Marketing
2670 Cherry Ln.
Walnut Creek, CA 94596
(415) 938-2860
Telex: 17-1852

What Do We Name the Baby?

Prospective parents can use this program to help them choose a name for their new child. A data base of over 2,500 names can be drawn upon according to gender, initial letter, number of syllables, ethnic origin, and group designation. The computer prints out possible names. (List Price: \$25; manual only, \$10)
Requires: 48K, one disk drive, (printer optional).
Metamorphics Inc.
154 Montgomery Ave.
Bala Cynwyd, PA 19004
(215) 668-9000

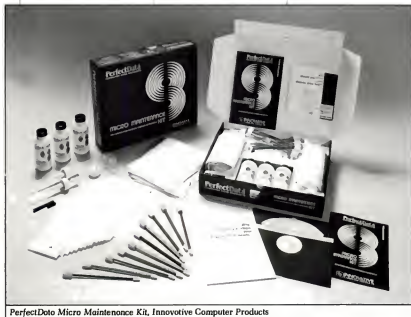
Word Perfect

Those new to data processing will find that this program has been designed with them in mind. It performs word processing chores including document merging, text search, automatic headings, footers, pagination, and footnotes. It can handle large files, and it will support two letter quality printers. (List Price: \$545)

Requires: 64K, two disk drives, 80-column monitor, printer.
Satellite Software International
266 W. Center
Orem, UT 84057
(801) 224-8554

PC Poetry

A novel software product that displays eight new poems. Titles include "Xmas Wish," "Life," "Time," and "Answer Man." (List Price: \$19.95)
Requires: 48K, one disk drive, 80-column monitor.
Business Application Systems
P.O. Box 36006
Ooklondon, IN 46236
(317) 897-5350



PerfectDoto Micro Maintenance Kit, Innovative Computer Products

A 16-Bit Christmas

MEM Memory Expansion Modules

Anyone tired of replacing Christmas tree light bulbs and anxious to move on to a genuine do-it-yourself project will like these kits. They include 16K expansion chips to take the computer to 64K and an I/O board that can contain from 64K to 256K. The MEM16 is a kit of chips that plugs into sockets on the main board inside the computer.

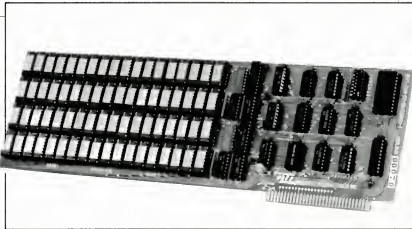
The boards add either 18K, 64K, 128K, 192K, or 256K bytes of storage to the PC by plugging into the I/O connector slots inside the computer. Expansion kits are also available for the memory boards. (List Price: MEM16 \$25; MEM64 \$295; MEM256 \$355) Moynord Electronics P.O. Box 3322 Longwood, FL 32750 (305) 869-9058

Floppy Disks

Useful and affordable gifts for someone on a tight budget. BASF offers tested floppy disks in soft-box, bulk, or plastic storage cases. (List Price: \$3.50 to \$5 each, depending on quantity and packaging) BASF Systems Corporation Crosby Dr. Bedford, MA 01730 (800) 343-4600, (617) 271-6608 Telex: 951856 (Domestic) 8817069 (International)

Envision Color Printer

Christmas correspondence could be more colorful in red or green print. This color printer can execute letter quality text and high-resolution graphics. A multicartridge ribbon and carriage control system allows up to four separate ribbons to be used, permitting flexibility in select-



Moxi-RAM Board, Memory Technologies

ing ribbon color or type. It includes a high-speed, 18-wire dot matrix printhead. Print speed is 100 cps. The printer switches between multiple fonts that are stored in firmware or downloaded from the host computer. All fonts support seven languages. (List Price: \$3,950) Requires: Stender printer parallel interface. Envision Corporation 683 River Oaks Pkwy. San Jose, CA 95134 (408) 946-9755

HDIII

Providing storage for a large quantity of data is the purpose of this hard disk subsystem. It comes in 9.5 and 6.3MB configurations and will drive up to four disks. The system also includes chassis, PR, controller, bus adapter, 5 1/4-inch disk drive, and software. (List Price: 6.3MB subsystem \$2,895; 9.5MB subsystem \$3,395; PC adapter and HDIII driver software \$249) VR Data Corporation 777 Henderson Blvd., Ste. N-6 Folcroft, PA 19032 (800) 345-8102, (215) 461-5300 Telex: 845-124

Model DXY Four-Color Plotter

Making Christmas cards can be fun with this X-Y coordinate plotter. It has a 10-inch by 14-inch effective plotting range and includes four pens, pen holders, and chart hold-downs. Functions may be expanded by additional ROM. (List Price: \$949)

Requires: Parallel interface. Amdek Corp. 2420 E. Oakton St., Ste. E Arlington Heights, IL 60005 (312) 364-1180 Telex: 25-4786

Comp*U*Stone

A novel way to do this year's Christmas shopping could be to use this discount, electronic shop-at-home service for subscribers to interactive cable television systems. Users access the data base and view listings of more than 30,000 products from more than 200 manufacturers.

Products are discounted up to 40 percent below list price and include major appliances and athletic and home entertainment equipment. The service features home delivery.

monthly listings of discounted bargains, consumer hints, and product evaluations. This service is accessible via a nationwide data communications network, Tymnet, or any two-way cable television network that operates as a data communications gateway. Warranties on all products. (List Price: \$25 membership fee; prime time \$18 per hour; nonprime time \$5 per hour)

Requires: 48K, one disk drive, modem, communications serial. ASCII Comp-U-Cord of America 777 Summer St. Stamford, CT 06901 (203) 324-9261

Surge Protector

A power stabilizing unit that protects electronic equipment from power surges and voltage spikes. Designed for a single outlet, it is well suited to the PC environment, where one computer is usually plugged into an outlet at a time. (List Price: \$39.95) IGO-RALLY Corporation 2575 E. Bayshore Rd. Palo Alto, CA 94303 (415) 856-9800

Hayes Stack Chronograph

This calendar/clock system reports the day, date, and time and was designed for applications needing time-keeping, such as report generation, time-sharing, electronic mail, and light, burglar alarm, and sprinkler system control. It can operate in a 12- or 24-hour mode and has a battery backup in case of power failure. Two-year limited warranty. (List Price: \$249)

Requires: RS-232C Interface. Hayes Microcomputer Products Inc. 5635 Peachtree Corners East Norcross, GA 30091 (404) 449-8791

Color Monitors IIA, III, IV

Monitors that provide color for exciting charts, graphs, and games. The 13-inch Color-IIA monitor features RGB video input and can display up to 16 colors. The commercial grade CRT

monitor offers high-resolution graphics display with RGB video input. The Color-IV is an RGB analog input monitor that features 560 (H) x (V) line resolution. One-year warranty on parts and labor; 2-year warranty on the CRT. Includes IBM cable. (List Price: Color-IIA \$999; Color-III \$569; Color-IV \$1,290) Amdek Corporation 2429 E. Oakton St., Ste. E Arlington Heights, IL 60005 (312) 364-1180 Telex: 25-4786

UltraRAM

This circuit board with gold-plated edge-connector traces is more intricate and sparkles more brightly than a Christmas tree ornament. The board can be placed in any unoccupied 64K segment within the PC's address space with no special devices, circuits, or modifications required. A parity disable switch provides a "don't care" feature if parity is not desired or required by the user. The IBM diagnostics can test the memory board (both the power-up and

IBM advanced diagnostics test).

Boards are available in 64K increments from 128K through 512K with socketed memory upgrade kits, as required. An instruction/operational manual is included to fit the IBM user manual. (List Price: \$1,800) Doystor Systems Incorporated 10511 Church Rd., Ste. A Dallas, TX 75238-9980 (214) 341-8136

Spectrum Series

A multifunction board combining memory, serial communications, and parallel printer interface functions. Four configurations are available, varying according to memory of 64K, 128K, 192K, and 256K. Field expansion kits are available in 64K increments.

Spectrum offers programmable baud rates ranging from 50 to 19,200, in either single- or dual-channel configurations. The parallel printer port lets users choose from a variety of dot matrix, letter quality, and high-speed impact printers. A field expansion kit is available for the

printer. (List Price: From \$435, depending on the configuration) **Requires:** 64K.

Personal Systems Technology 22857 La Codeno Laguna Hills, CA 92653 (714) 859-8871

Mousetrak

"Twas the night before Christmas and all through the house, not a creature was stirring, not even a mouse." This definitely won't be the way events transpire in the household that opens presents on Christmas Eve and gets Mousetrak. It is a graphic input device that replaces joysticks and game paddles used for games, business graphics, and CAD/CAM applications. This two-dimensional hand-held tracking mechanism operates on a table or desk top. It features three switch select buttons. (List Price: \$99.95)

Requires: Game adaptor. XEC Company 14222 Dollos Pkwy. #1104 Dallas, TX 75240 (214) 980-9736

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A 16-Bit Christmas

AJ Daisy Wheel Printer

Designed for personal computer users and small businesses, this letter quality printer has changeable typefaces and a full ASCII keyboard with a numeric keypad. It prints at 30 cps, has high-resolution X-Y plotting, complete electronic forms control, and a 128-character buffer. Options include a forms tractor, a pin-feed platen, and paper trays. A print wheel, ribbon cartridge, and cable are included with the purchase. (List Price: \$985)

Requires: RS-232 interface.
Anderson Jacobson
521 Choroot Dr.
San Jose, CA 95131
(408) 946-2900

TypePrinter 221

An electronic typewriter that can be connected to the PC to become a letter quality printer. When connected to a modem, it can become a stand-alone terminal without the aid of a computer or a separate CRT display. The typewriter has changeable daisy wheels with over 40 type styles available at extra cost. The printer has a correctable carbon ribbon and prints in regular, underline, bold, bold underline, and reverse type print. The printer can access Telex and TWX networks through message conversion companies. (List Price: \$2,850)

Requires: Parallel interface. Modem and serial interface needed to access Telex and TWX.
Rogers Products Company, Inc.
249-B East Emerson Ave.
Orange, CA 92665
(714) 974-6302

ACCESSORIES

PerfectData Series

A variety of kits composed of cleaning and maintenance products may be a good gift for someone who takes pride in his or her PC and wants to take good care of it. The Tach Maintenance Kit cleans tape paths, guides, and read/write heads. The Video Display Cleaning Kit cleans terminal screens and keyboards and neutralizes static charges. The Micro Maintenance Kit combines components from all the other products into a single package for users starting a preventive maintenance program for their microcomputer system. (List Price: Head Cleaning Kit \$29.95; Micro Maintenance Kit \$39.95; Tech Maintenance Kit \$24.95; Video Display Cleaning Kit \$12.95; Anti Static Kit \$5.95)
Innovative Computer Products
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Need somewhere to put the computer other than the living room floor? Computer tables, shelves, and printer tables are available in oak or birch with a natural or stained finish made of hardwood and hardwood veneer. (List Price: 46-inch work table \$175; with top-sider shelf unit \$195; 36-inch work table \$170; printer table \$165; top-sider shelf unit \$30)
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(805) 965-2158

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Scottsdale, AZ 85253
(602) 948-8022

BlueBook PC: BlueBook PC: BlueBook PC: BlueBook

SAMUEL E. KESCHICK
P.O. Box 741513
Houston, TX 77274

PC MAGAZINE 380 NOVEMBER 1983

XF-DUMP FILE UTILITY

Machine language full-screen utility allows Display, Alter (Edit), Print, and Search of file/absolute sectors. Hex and character formats for all functions. All file types supported. Delete, Rename, and List directory functions included. \$70.

DISTRIBUTED SOFTWARE SYSTEMS, INC.

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Disks provide: Electronic Disk, Print Spooling, and Ten Sector Formats (25% more bytes per diskette). PC-DOS 1.10 support for hard disks, 8-inch floppies, and quad drives (TM100-4). OEM systems available. \$50.

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1036 Los Altos Ave.
Los Altos, CA 94022
(415) 941-5500

BASIC PROGRAM LISTER

Utility to print out basic program listings. Formats each line (max 75 characters), indentation, page numbering, and skips page perforations. Heading provides program name, date, and time. Specify cassette or diskette. Send \$19.95 to:

DATA PROCESSING SERVICES

P.O. Box 633
Hemdon, MA 22071

UNPROTECTOR

With this program your protected BASIC programs that were accidentally saved on the disk with the P option can be listed, modified, and saved in the unprotected form. Check or money order for \$24.95.

ALPHA COMPUTER SERVICE

P.O. Box 2517
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(714) 894-6886

SOFTPOOL

Software spooler outputs data to printer while executing any program that runs under DOS. Program execution no longer linked to printer speed. Buffer sizes vary (1-128K). Increases productivity: ideal for business. \$49.95 (Disk, documentation, \$2.50 S&H. MC/VISA. MA residents add 5% sales tax).

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UTILITY PROGRAMS

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PC-DECOMP, powerM data base \$49.95.
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PC-GRAM, an efficient access method \$29.95.
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PC-SORT, text subroutine/program \$29.95.

RES CONSULTANTS

2635 Frye Landing
Sunnyvale, CA 77478
(713) 990-4395

PC SPOOLER SOFTWARE

Save time and money. Try PC Spooler Software. Print files in background while you continue to work in foreground. Requires monor printer or printer adapter, DOS 1.0 or 1.1, and SS or DS drive. Instructions included. \$45.

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SoftPrintSoft makes the perfect marriage between any serial printer and your IBM DOS, XON/XOFF, and hardware handshake protocol supported. Now UltraPrint/RSIC key work with your serial printer. By pressing the F key, the FORTH programming language becomes activated. (Consulting available) \$59.95.

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P.O. Box 13547
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(904) 645-8484

BASIC AIDS

Structure your source code with page control and line cross-reference. Copy our menu drivers with partial program copy. Use our Menu Replace to modify variables. Streamline your programming with function key reload. Order BASIC AIDS PC-DOS SOURCE CODE (65K) \$250. Cash for enhancements.

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P.O. Box 14097
Tulsa, OK 74104
(918) 747-0151

ALT-PRISC

The first language-independent graphics screen print program for IBM or Epson MX-80 printers with Graphics option. Executed by pressing Alt-Prisc. No modifications to new or existing programs will ever be necessary. \$24.95.

THE SECOND SOURCE

P.O. Box 23567
Washington, DC 20024

DISKETTE UTILITY PROGRAMS

S-DRI, Sorted-Directory program, produces diskette directory listings sorted by any field in the directory. Clean-Up facilitates erasing files by displaying file names and asking you if the file should be erased. Professionally typeset documentation fits in the PC-DOS manual. Each utility \$25, both \$40.

OPTIMUM DATA PROCESSING

P.O. Box 2167
Humbre, TX 77347
(713) 454-7426

SUPER ZAP

Super Zap allows access to files/absolute disk sectors. Cursor may be positioned on any byte and byte altered in hex/octal/decimal/ASCII. Sector positioning by binary/ASCII string. Offset, sector no., forward/backward scrolling. Other functions: file/sector printing, DIR list, sector saving, customization. \$45.

ALTA SYSTEMS, INC.

P.O. Box 9802 #181
Austin, TX 78766
(512) 636-7351

COMPRESS/DECOMPRESS

Removes all comments from BASIC programs and places as many statements on one line as possible. Cuts out program size by 50%. Decompress performs opposite function. Requires 64K, one disk drive. \$50. Star Trek, a new version of an old classic, \$25. Call Andy Neede.

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5252 Thomtree
Irvine, CA 92715
(714) 551-9191

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SPECIALTY SOFTWARE

402 Grand Ave.
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(408) 462-4523

PC TOOLBOX

EDR-formatted information about files and used/free space. List—file printing with total printer control, heading and format options. Clock—continuous time screen with alarm. File Utility—assign/remove "hidden" status, recovers deleted files. Monitor—dynamic switch between color/BW CRTs. \$35.

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NEW VIDEOGRAPH PLUS

A totally machine language graphics print utility. The PRISC key triggers automatic printing of four-color shaded graphics on full monochrome character set. Features variable horizontal/vertical sizes, rotated and inverted images. Pictures may also be printed from a disk file from your own program.

WINDMILL SOFTWARE, INC.

1058 Joan Dr.
Burlington, Ontario
L7T 3P2 Canada
(416) 632-6279

THE NORTON UTILITIES

A comprehensive series to enhance PC-DOS. DiskTool displays everything about diskettes. UnErase recovers lost files. SetMod modifies diskettes. FileLock controls hidden files. Buy them individually, or the whole package of over a dozen (\$80). See display ad for details.

PETER NORTON

1716 Main St.
Venice, CA 90291

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Concord (PROAD) is a program to organize and present menu efficiently. No more modifying source codes of menu program when adding or deleting programs. Offers one main menu and up to 14 submenus with 15 options per menu. \$90.

COMSEN, INC.

20-A Erford Rd.
Lemoyne, PA 17043
(717) 737-2049

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General Sort/Merge/Select Utility for BASIC, Pascal, FORTRAN, COBOL, & Mergelike files. Written in 8086 Assembler. Sequential/random files. External/Internal formats. Interac-param-prompt. Only \$80.

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3 Chockery Ct.
Glen Arm, MD 21057
(301) 668-9011

Software/Word Processing

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A word processor so handy you probably won't need the excellent documentation provided. Word wrap, line insert, PC-DOS files, variable colors, word search, serial or parallel printers, 32K, plus much more. Credit cards accepted. \$49.95.

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P.O. Box 16506
Seattle, WA 98116
(206) 937-0961

WORD/PC

A user-designed word processor combining simplicity and power. Align, Fill, Copy/Merge, multiple-line spacing, Word Wrap, Centering, Search, Insert/Delete, Word count, three print styles, Help screens, more than 40 features. MAILMERGE/PC and other modules available. Requires IBM, 1 disk drive. MS-DOS. \$69.95.

COMPSON

9816 N. Bellevue
P.O. Box 5049
Littleton, CO 80123
(303) 794-0858

Software/Other

WES

Freely word processing power with multi-emulators, mail merge, date base recall, and macro language. Super for boiler plate, invoices, letters, programs, and reports. IBM PC function and cursor keys implemented. Interactive prompts speed learning. Use Manual and 20 practice jobs assure mastery. Seminars. Three key-activated operations immediately update screen: double space, justify, collapse, word wrap, center, move, search, change, delete, undo, buffers, DOS files, macros, margins, tabs (vertical, regular), indent, scrolls (row-wise, lock), add, subtract, multiply, divide, pad answer, modes (insert, overwrite, command), page (headers, footers, foot notes), and print (screenable copy). \$395 (\$295 introduction). Manual \$30.

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137 Main St.
Westerly, RI 02891
(401) 596-1811

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Let The Terminal liberate you from interminable attendance upon your terminal. Simulate ENTIRE INTERACTIVE SESSIONS—PC to PC, DUNS, SOURCE, etc.—cut connect time, reduce repetition. Capture any volume of data, move it all between communication channel (SEND) and (RECALL, WRITE). Inspect, filter incoming data (FEEDBACK, FWDISE). Adapt to any protocol—create your own (SET). Reconfigure baud rate, stop bits, word length, parity with ease (INT). Complete transmission error handling capabilities plus monitor low-level controller events (SEND, TRACES). The Terminal provides these features and much more in a unique, comprehensive, easy-to-use, communication control language. Terminal just one of 65 key words! \$131; manual only, \$31. Check or money order.

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New On The Market

HARDWARE

Maxram

A plug-in, expandable memory board that provides from 64K up to 1 megabyte of memory with optional error correction. It uses 64K-bit chips to provide memory expansion and is designed to handle 256K-bit chips when they become available for quantity purchase. It doesn't require wait states and includes full parity error detection.

Hooks for an optional EDC/ASYNC board are provided for single- and double-bit error correction. An IBM-compatible async port is also provided. (List Price: 64K \$350; 128K \$460; 192K \$570; 256K \$680; 320K \$760; 384K \$880; 448K \$980; 512K \$1,080)

Micro Synergy, Inc.
1327 Whitacre Dr.
Clearwater, FL 33516
(813) 535-6635

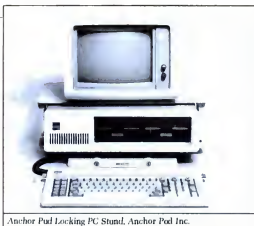
Save-a-Slot

A piggy-back board that allows up to 256K of dynamic memory to be placed on the system (mother) board of the PC. Installation eliminates the need to use an expansion slot. The board is available either in kit form for user installation or as a fully installed and tested board. (List Price: Bare circuit board \$49.95; fully socketed, 256K board installed \$649.95)

System 300
3030B Q St. #125
Sacramento, CA 95816
(916) 452-1476

8 Port Serial I/O Board

A board that supports the connection of up to eight terminals for implementing multiuser operating systems. It allows several users to have access to each other's data at the same time. The board uses eight of the asynchronous controller chips that IBM uses on its serial card. The



Anchor Pad Locking PC Stand, Anchor Pad Inc.

pinouts are female, however, so the PC acts as a host instead of a terminal. The port addresses and interrupts are switch selectable. The communication parameters can be configured in software.

The board comes with a bracket that can be mounted on the rear panel of the PC and which holds up to 16 DP-25 connectors. The bracket is available separately, and can be used for mounting connectors for other multipurpose boards. (List Price: \$950; bracket only: \$50) Control Systems
2855 Anthony Ln.
Minneapolis, MN 55418
(612) 781-5043

Microline 84

A 136-column, letter-quality-capable dot matrix printer with dot addressable graphics and proportional spacing. Because it prints in both letter quality and data processing modes, it can handle both word processing and systems applications.

Features include superscripts/subscripts and underlining; a choice of friction or tractor-fed forms handling; 72 by 72 and 144 by 144 dot-addressable graphics; a down-line loadable

font of 64 characters; proportional spacing in letter quality mode, and a 12-channel Electronic Vertical Format Unit. (List Price: Parallel \$1,385; serial \$1,495)

Requires: Cable.
Okidata Corp.
111 Gunter Dr.
Mt. Laurel, NJ 08054
(800) OKIDATA
(609) 235-2600

Memory Expansion Kit, Floppy Drive Controller

These 16K memory chips (speed not available) expand system board memory. The floppy drive controller board is compatible with the PC's floppy disk drives or the manufacturer's own internal and external floppy disk drives. The board plugs into the position 5 slot on the system board's I/O and connects to the internal drives. The controller

can use dual-headed drives. External drives can be connected to the board at the rear of the system. An internal floppy cable is included. (List Price: 16K expansion kit \$25; floppy drive controller \$185)
Moynord Electronics
P.O. Box 3322
Longwood, FL 32750

M-192

A memory expansion board with 192K RAM. The board was designed to be installed by users and has no switch to set. It comes with a 1-year warranty. (List Price: \$425)

Requires: 64K.
Chintronica Co.
19 Longmeadow Rd.
Chelmsford, MA 01824
(617) 256-7862

External Drives

A single/dual drive 5¼-inch disk external drive system. The system includes Tandon TM100-1 drives, cable, cabinet, and power supply. An internal switch setting is necessary for PC-DOS to recognize the drives. (List Price: Two single-sided drives \$665)

Requires: Internal disk controller.
Peripheral Technology
3760 Lower Roswell Rd.
Marietta, GA 30067
(404) 873-0042

Color Graphics Controller

A color graphics controller with 1,024 by 1,024 resolution. The controller makes the monitor into a graphics terminal for industrial applications such as

New on the Market does not review products, but reports information provided by the manufacturer. If you have a product you would like to have included in this section, send a brief description that includes applications, price, and system requirements to New on the Market, PC, 1528 Irving St., San Francisco, CA 94122. Photographs and illustrations are run on a space-available basis.



New On The Market

CAD/CAM. The initial software included with the board is a callable graphics library running under DOS or Qunix.

The controller mixes graphics with text in the mixed mode. In the character mode up to 282,000 characters can be stored in memory, representing up to 80 pages of normal text. High resolution allows much smaller characters and more font variations. New fonts can be coded into ROM and changed easily. The controller comes with both TTL output and EIA RS-343 standard RBS output. Other features include: 18 colors, 16:1 zoom, pan, scroll and paging, light pen, and TTL and RGB output. (List Price: 128K \$2,495; 512K \$3,195)

Control Systems
2855 Anthony Ln.
Minneapolis, MN 55418
(612) 781-5043

program listings by writing over displayed graphic images. The graphic resolutions are achieved by a second memory plane, which can be merged with the basic memory plane to form a composite display. The two planes may be displayed either independently or simultaneously to create the overwrite feature.

The adapter occupies one expansion slot and is not slot sensitive. An integrated parallel printer port saves an expansion slot for other needs. The adapter is compatible with all existing IBM software. (List Price: \$995 including documentation and start-up software)
Plontronics/Frederick Electronics Corp.
7630 Hoywood Rd.
P.O. Box 502
Frederick, MD 21701
(301) 682-5901

remaining 96K can be used as standard memory expansion with DOS or applications software. Access to the memory is transparent to the video display.

In Mode 1, users can select one of six available graphics modes, including 16-color, 320 X 200 and four-color, 640 X 200. The high-resolution mode, Mode 2, utilizes the entire 128K for display, supporting four-color, 640 X 400 and 16-color, 320 X 400.

The interface is supplied with an enhanced high-resolution light pen circuit and has the ability to operate as a monochrome video display adapter. (List Price: Not available)
Micro Integrations Inc.
P.O. Box 519
Yorktown Heights, NY 10598
(914) 245-3416

Graphics Adapter

A single-slot graphics adapter that allows high-resolution graphics to be displayed on the PC's monochrome display. Graphic resolution is 720 by 350 pixels. The display is bit-mapped and provides two pages of graphic memory. The text and graphics display memory are independent; all combinations of text and graphics displays can be selected by software.

The adapter comes with an IBM-compatible joystick adapter to allow the connection of a graphical input device. Full software support is provided, including a package of BASIC-equivalent graphics routines that can be called from Pascal, FORTRAN, or other high-level languages. These can also be used from within BASIC. (List Price: \$495)

Requires: 64K, one disk drive.
Orchid Technology, Inc.
1084 Hillview Dr.
Milpitas, CA 95035
(408) 942-8660

ACCESSORIES

Epson Nylon Ribbon Replacement Cartridge

A nylon replacement cartridge for Epson MX printers. The cartridge is available in black, red, blue, green, and brown. (List Price: MX100 ribbons \$13; MX70/MX80 ribbons \$8.50)
Aspen Ribbons, Inc.
1700 N. 55th St.
Boulder, CO 80301-2796
(800) 525-0646, (303) 444-4054
Telex: 45-0035

Storage and Protection Accessories

Four accessories for the PC. The keyboard dust cover is made of rigid smoked-bronze plastic and is individually bagged and boxed.

The disk drive cover is made of black plastic and protects the front of the disk drive(s) from dust. A vinyl foam seal around the perimeter helps prevent damage.

The carrying case contains high-density foam padding that holds the system unit, keyboard, disk box, and manuals in place for protection during transport. The case is made of high-strength, lightweight plastic with an aluminum frame.

The manual rack is made of black plastic and has individual spaces for six system manuals. (List Price: Keyboard dust cover \$12; disk drive cover \$8; carrying case \$120; manual rack \$24)
Not Hellmon III Inc.
5951 E. Firestone Blvd.
South Gate, CA 90280
(213) 773-3576

Anchor Pad

A three-tiered computer security system that guards the PC's components against theft. Each component is individually secured, permitting quick and



Monoual Rack, Not Hellmon III Inc.

Colorplus

A color/graphics adapter that can produce high-resolution multicolor graphics. It provides high-resolution (640 by 200 pixels), 4-color, 80-character graphics or medium-resolution (320 by 200 pixels), 16-color, 40-character graphics.

The adapter helps debug

M197 Color Graphics Interface

A color graphics interface with resident memory expansion and 16-color capability. The interface has 128K bytes of RAM operating in one of two memory-mapped modes. Mode 1 uses 32K RAM for graphics while the

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Graphics Adapter, Orchid Technology

easy removal for service and relocation. The Anchor Pad increases desk space, and swivels 360 degrees. It will not damage furniture or equipment.

Pads are also available for the keyboard and other equipment such as telephones and typewriters. (List Price: \$445 including delivery and installation)
Anchor Pad, Inc.
3224 Tatcher Ave.
Morino Del Rey, CA 90291
(213) 306-3881

SOFTWARE

Data Design

A menu-driven data base manager that supports multiple user-defined data tables and input/output (I/O) forms. The forms are used as a window into the data table. Users can enter, browse, change, and print information. Because users can create 26 different forms for each table, they can see the data table in different ways.

Other features include user definable record size, field type, and width. User-definable print formatting is available for custom reports. Information can be retrieved by users in ascending and descending order.

The program includes several ready-to-use forms such as mail-list management and a simplified accounts receivable system. (List Price: Software and manual \$225; Query Language \$75)

Requires: 128K, one floppy disk drive or one hard disk drive (printer recommended).
Insoft, Inc.
10175 S.W. Barbur Blvd. #202B
Portland, OR 97219
(503) 244-4181

C88

A software development package that consists of a compiler for C language, a linkage editor, and a library of functions. The compiler accepts a large subset of the C programming language (as developed by Bell Laboratories). An L88 linkage editor that comes with the program allows modules and functions to be linked together, either by direct conversational interaction with the user, or via linking instructions contained in a command file. The linker produces a map of symbols to aid in debugging.

The library contains numerous routines and functions that are used in systems tape programming and can be accessed via the L88 linker. These functions include: shell sort, sequen-

tial disk I/O package, random disk I/O package, screen and cursor I/O package, keyboard handling routines, string manipulation routines, memory and I/O device access routines, and operating system interface routines. (List Price: \$250 including documentation)

Requires: 64K, two disk drives.
Intellect Associates Inc.
P.O. Box 365
Holbrook, NY 11741

Pairstat

A statistics program that provides a collection of tools to evaluate and present X-Y plotted data. The program includes data entry, computation, and editing features. Users can enter data for scattered-point or smooth line plotting. Up to 1,000 data pairs can be used and up to 11 different data sets can be plotted on one graph. Up to 20th order polynomial regressions can be performed.

Statistical results include R square, standard deviation, plot of residuals, beta, standard error of coefficients, and mean. Users can define functions to manipulate data, and seven different types of reports can be generated on the printer. (List Price: \$150; discounts are available for user groups)

Requires: 64K, one disk drive, 80-column display, printer. (When using an Epson printer, the Graphtrax option is required for smooth line plotting.)
Dovell Custom Software
P.O. Box 4162
Cleveland, TN 37311
(615) 336-3055

Video Link 88

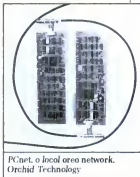
A menu-driven communications package that allows the PC to function as an intelligent terminal capable of acquiring and recording information from other computer systems. The program offers full-featured com-

munications support and requires no previous knowledge or communications experience.

Under the program, the PC can access or link itself to a variety of remote systems: other IBM PCs; microcomputers; minicomputers; networks such as The Source, Dow Jones, Telenet, Tymnet, Datapac; and time-sharing systems.

Other features include full support for the Hayes Smartmodem, support for both acoustic couplers and direct connect modems, and select data transfer rates of up to 1200 baud. Communication sessions can be selectively recorded to disk or printer and data can be saved and transmitted both to and from remote systems. Users can redefine terminal specifications to suit their requirements. (List Price: \$39.95)

Requires: 64K, one disk drive, asynchronous communications



PCnet, a local area network, Orchid Technology

card, modem of up to 1200 baud.
Windmill Software Inc.
1056 Joan Dr.
Burlington, Ontario
Canada L7T 3H2

PCText

A text processing program that can be used with any text editor to produce formatted documents. PCText can be used to



New On The Market

create large documents with many chapters or subsections. Each of these chapters or subsections can be edited separately using a standard text editor and then formatted as one large document using the "embed" capability of PCText.

The program uses simple commands that are contained in

patible with the program. Many of the normal editing functions are supported by single strokes of the function keys.

Standard ASCII files are created and maintained by the program. The files can be used with a variety of programs and languages, including BASIC, Pascal, FORTRAN, assembly, C88,

ties as they occur. When using the mail merge and data base recall, users can draw facts and numbers from any ASCII file. This information can be gathered whether it was created by WES, another word processor, or as output from a BASIC, FORTRAN, COBOL, or other data processor.

to unscramble the encryption will be forwarded. (List Price: \$49.95 including manual, demonstration program, and full program in encrypted form)

Requires: 48K, one disk drive, DOS or CP/M-86.

SoftLink

3253-2 Scott Blvd., Ste. A
Santo Clara, CA 95051
(408) 988-8011

PC-Spooler

A software program that handles printing files, thus freeing the computer for other work. Printer adapters require a one-way cable modification.

Instructions are included. (List Price: \$45)

Requires: One disk drive; monochrome display and printer adapter or printer adapter alone; DOS 1.0 or 1.10.

Microd Associates, Inc.
P.O. Box 1759

Kingston, NY 12401
(914) 338-3306

PCnet

A local area network with full system software support. Under the PCnet system a group of PCs can share one or more hard disk units, thereby eliminating floppy storage "disk jockeying."

Files can be shared and transferred between users. A protection system ensures that only the file's owner can erase it. The system works with PC-compatible hard disk units.

PCnet provides high speeds (nearly 1M bps) and a long-distance (up to 7,000 feet) network. Its large address space (up to 64,000 nodes) eliminates expansion problems. For multi-PC applications, such as accounting or inventory control systems,

PCnet provides simultaneous file access interlock and a general purpose network semaphore system to lock records within a file. PCnet provides resource sharing and multitasking. Peripheral equipment, such as a



Keyboard Dust Cover, Not Hellman III Inc

the data file to perform functions such as: indentation, centering, line spacing, margin control, page numbering, pagination, and numbering and embedding one document within another. (List Price: \$100 including documentation and manual)

Requires: 48K, one disk drive, printer.

Intellect Associates Inc.
P.O. Box 365
Holbrook, NY 11741

Window

A full-screen text editor that can be used to create or edit textual documents, correspondence, or programs in any of the PC-compatible languages. The program can be used by inexperienced users and takes advantage of both screen and keyboard capabilities. All the inscribed keys, including ScrollLock, INS, Del, PgUp, and PgDn are fully com-

patible with the program. Many of the normal editing functions are supported by single strokes of the function keys.

Requires: 64K, one disk drive.

Intellect Associates Inc.
P.O. Box 365
Holbrook, NY 11741

WES

A word processor with math capability. The program integrates visual editing, printing, mail merge, data base recall, and nonformula math. The math feature allows operators or a macro command to +, -, *, /, or % any number in the text into an accumulator. Answers can be replaced into the text where desired.

Interactive prompts give operators the power to control the paging, printing, mail merging, and data base recalling activi-

ties as they occur. When using the mail merge and data base recall, users can draw facts and numbers from any ASCII file. This information can be gathered whether it was created by WES, another word processor, or as output from a BASIC, FORTRAN, COBOL, or other data processor.

Requires: 42K; CP/M-80, CP/M-86 or DOS.

Westerly Business Systems
137 Main St.
Westerly, RI 02891
(401) 596-1611

Demo Review

A business software demonstration package that lets business users test SuperCalc, SpellGuard and Office Integrator for up to 8 months. One function in each of the programs is encrypted, however, under SoftLok. To use all the program features, the user must pay the balance of the full price. A copy of the key code

letter quality printer attached to one PC, can be shared by all other PCs. Remote commands are queued, and the user is notified when they are completed.

The system software package is DOS 1.10-compatible and is included with each PCnet adapter. It consists of both the operating software and configuration utilities. (List Price: \$699)

Requires: 64K, one disk drive. Orchid Technology, Inc.
1084 Hillview Dr.
Milpitas, CA 95035
(408) 942-8660

Qunix

An operating system based on the UNIX operating system. Qunix includes hierarchical file structure to let users organize files by topics. File access security by password prevents files from being read, changed, or executed by others. Qunix allows users to communicate with any other computer, personal or mainframe, through a telephone line or cable.

The command language lets users tailor the system to their particular needs by writing new commands or combining old ones. The file utilities feature includes commands for printing, sorting, comparing, and backing up files. The operating system is compatible with a variety of disk drives, modems, and printers. It can also read disks written under DOS. (List Price: \$850)

Requires: 96K, two disk drives. Quantum Software Systems
7219 Shea Ct.
San Jose, CA 95139
(408) 629-9402

Seed

A data base management system that supports both hierarchical and network data. The program can be used as an applications development tool or as a decision support system. Users do not have to know how data is

managed within the computer system.

The program consists of a data description kernel and a data manipulation interface for Pascal and FORTRAN. An interactive data manipulation processor, query language (Harvest), a report writer (Bloom), a screen designer, file converters, and maintenance utilities are included. (List Price: \$985; transaction processing option \$795; documentation only, \$100)
Requires: 320K, one disk drive. Micro Decisionware
4890 Riverbend Rd.
Boulder, CO 80301
(303) 443-2706

Stockvue

A program that helps stock brokers and individual investors calculate potential profits and risks on investments. Stock or option traders can use the program to answer "what if"

according to the Securities and Exchange Commission's rules on margin requirements. The program is available on disk or cassette. (List Price: \$129.95)

Requires: 64K, one disk drive. Stor Value Software
12218 Scribe Dr.
Austin, TX 78759
(512) 837-5498

SoftCable

A print spooler for all common serial printers that adapts to the control lead and protocol requirements of various printers through software configuration. Buffer sizes are selectable from 1 byte to 1/2 megabyte, allowing the spooler to handle printing while the PC does other work.

Included are preconfigured drivers, a screen-oriented configuration editor, a command facility with status and Help functions. (List Price: \$39.95 including a user guide



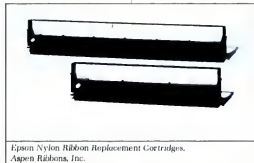
External Drives, Peripheral Technology

ate data entry forms directly on their screens. These forms can then be used for data entry, retrieval, modification, correction, deletion, and report printing. A complete data base of user-specified format and content can be kept and accessed using the DMS program.

Data base files are maintained in a sequential ASCII form that can be processed by a program written by the user in BASIC, Pascal, C, and assembly language. It allows DMS to have a secondary use as a front-end data entry program for user-written applications systems. (List Price: \$150)
Requires: 48K, one disk drive. Intellect Associates Inc.
P.O. Box 365
Hollbrook, NY 11741

Concurrent CP/M-86

A single-user multitasking operating system that allows users to accomplish several tasks simultaneously. Multiple list devices are supported with up to 18 drives managing up to 512 megabytes each. File integrity is ensured with the Record and File Locking functions. Protection for user files and directories is enhanced through the optional use of passwords. Features can be used to monitor real-time events. Process synchronization and communication are sup-



Epson Nylon Ribbon Replacement Cartridges, Aspen Ribbons, Inc.

questions and implement that information to make investment decisions.

The program posts relevant data on a single screen in spreadsheet format. Investors can scan the information, change variables, and consider other options. Included with the spreadsheet display are calculations of dividends, interest (margin trades), trade commissions, and exact opening cost

with tutorial reference and diagnostic information]

Requires: DOS, asynchronous communications adapter. The Gauge Group
P.O. Box 34082
Phoenix, AZ 85067
(602) 279-1533

Data Management System (DMS)

A self-prompting, menu-driven program that allows users to cre-



New On The Market



Disk Drive Cover, Nut Hellman III Inc.

ported under CCP/M-86 by queues.

Features include virtual console environment and compatibility with CP/M-86 and MP/M-86 operating systems. The operating system can also manage up to 1 megabyte of memory and support shared code. (List Price: \$350)

Requires: 256K, two disk drives, (printer recommended).
Digital Research
P.O. Box 579
Pacific Grove, CA 93950
(408) 649-3896

Sort/PC

A sort/merge program that can sort records of up to 32,760 bytes. The program allows for up to 29 distinct sort keys and can sort character, numeric, and packed decimal fields in ascending or descending order. The program also allows for up to 10 input files and can be invoked from DOS or an applications program. (List Price: \$87 including documentation; documentation only, \$12)

Requires: 48K, two disk drives.
Icon, Ltd.
P.O. Box 57380
Washington, DC 20037
(202) 429-9607

Championship Blackjack

A game that employs a realistic table layout and can be used by as many as six players. Single players can also use the program

with the PC filling in for the other five players. The program can suggest moves and will provide a rundown of the number of hands won, wins over losses, and overall highest scores at the end of each game. (List Price: \$34.95)

Requires: 64K, one disk drive.
PCsoftware
4155 Cleveland Ave.
San Diego, CA 92103
(714) 279-2482

P-Edit

A full-screen program/text editor that uses a virtual edit buffer. The buffer makes it appear to the user as though an entire file is in the edit buffer regardless of file size. P-Edit's features include search and replace, block or range, dynamic insert, horizontal scrolling, variable tabs, half-tab, and duplicate line and field. Block or range operations include copy, move, delete, append, and print. A built-in help and self-instruction feature is also included. (List Price: \$195)

Requires: 48K, one disk drive, 80-column display.
Sotelite Software International
288 West Center
Orem, UT 84057
(801) 224-8554

Ultra Menu

A menu-driven business utility program that allows users to format or back up a disk and copy or run a BASIC program. The program was designed for clerical staff and computer novices

who want to run and maintain BASIC software.

Function keys are used to limit the number of keystrokes while simplifying processing. The Esc key is used to abort programs in process, when possible, returning the user to the main menu. Because of the function key and Esc key uses, DOS commands such as Format, Copy, and Diskcopy can be employed without extensive knowledge of manuals. (List Price: \$39.95)
Requires: 48K, one disk drive, 80-column monitor, DOS 1.0 or 1.10.

BusinessSoft, Inc.
3811 Brett Ln.
Clenview, IL 60025
(312) 940-8908

Micro-Football

A football simulation program that employs graphics and sound effects to create a pro-style football game. The program provides NFL strategies and formations, offering the player a choice of 14 offensive plays and four defensive alignments. (List Price: \$29.95)

Requires: 64K, color/graphics adapter.
Westwood Software
1670 N.W. Emperor Dr.
Corvallis, OR 97330
(503) 745-5500

Andromeda Conquest

A strategy simulation game of forming and protecting galactic empires. One to four players act as emperors of their respective species. Each player accumulates and guards resources while managing space colonies. (List Price: \$23)

Requires: 48K, one disk drive.
Avolon Hill Come Company
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-5300

Microcosm

A strategy-simulation game based on the mathematical sim-

ulation of birth, life, migration, and death among populations of cellular organisms. The game provides different levels of competition. The user can store and recall population patterns, both standard and user-created, and preview how moves will affect the next "generation." The "Programmed Tutorial," one of the menu-driven options, instructs inexperienced users in playing the game. The game is based on John Horton Conway's 1970 "The Game of Life." (List Price: \$39.95 including manual; \$2 handling)

Requires: 64K, one disk drive.
Aeon Concepts
Computer Products Division
1637 Red Mill
Pittsburgh, PA 15241
(412) 831-5352

Financial Modelers' Personal Financial Statements

A financial planning program for financial advisers. The program allows users to develop a picture of a client's financial position and then try different investment options to see how that position can be improved.

Two sets of financial statements showing balance sheet, taxable income, and cash flow can be projected as far as 5 years in advance. One set details the client's present position, and the other the effect of the user's advice. The package also includes tax tables, investment tables, tutorial models, and a teaching manual. Because the program models are connected, the effect of investment advice can be immediately reflected in the client's cash flow, taxes, and net worth. (List Price: \$725)
Requires: 96K, one disk drive, VisiCalc 1.10.
United Financial Modelers
26 Main St.
Concord, MA 01742
(617) 369-4218

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GP

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paperwork,
where
does one
even start to
make sense
of it all?**

Data Base Manager will help you keep track of virtually any information—and keep that information up-to-date and accurate!

Easy to Use

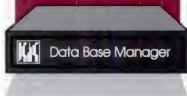
Data Base Manager is so easy to use that you will be able to record, access, and print valuable information after listening to the *spoken instructions*—a short, hands-on tutorial which comes with the program.

Powerful

Data Base Manager is a powerful software product that will help you do all of the following—and more!

- Design and print a report showing sales regions sorted and subgrouped by profits.
- Design and print a report which automatically calculates dollar sales by multiplying unit sales and unit costs.
- Find all customers who live in the Northeast, have low credit ratings, and outstanding balances—send them a letter explaining a new bank payment plan.
- Sort your mailings by zip code—save money on bulk mailing rates.
- Find a name or address even if you forget the exact spelling.

How about here.



Below is an example of a simple report you can generate with a few keystrokes. By sorting the DAYS OVERDUE column, the billing department knows which customers are late with their payments.

BALANCE OUTSTANDING REPORT

COMPANY	BALANCE	DAYS
		OVERDUE
ABC Company	23456	82
Jones Company	390	80
York Company	34569	80
GFD Corporation	1000	71
Ace Manufacturing Co.	87990	65
Applied Technologies	4567	61
M and Z Corporation	9000	50
Tyne Industries	7000	45
Advanced Systems	4390	28

NOTE: Send reminders to all accounts overdue 60 days or more

Features

- Searches—Phonetic Search
Wild Card/Key Word Search
Three-Level Search on Any Criteria
- Sorts—Numeric and Alphabetic
Ascending and Descending Order
- Reports—Automatic Tabbing and Layout (with Override Capability)
Preview Reports on File
Accommodates up to ten custom-designed reports
Computed Optional Field Capability
Flexible Format Mailing List
- Lets you know how many records you have on file and how many you can add
- Takes advantage of your printer's condensed mode automatically if needed
- Uses one program and one data disk—no disk switching required
- Works with DOS 1.0 and DOS 1.1
- Stores up to 2800 records per disk with DOS 1.1

Program Requirements

IBM Personal Computer with 64K of memory
Two disk drives (DOS 1.0 or 1.1)
Supports all monitors
Supports the following printer lines:
IBM PC, Epson, IDS, NEC, Okidata

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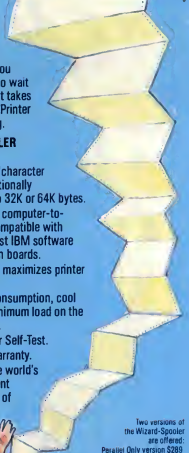
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WHY WE CREATED THE FIRST DOESN'T MAKE YOU WOR

by JIM EDLIN, PRESIDENT - BRU



A "writing tool" is what we call our improvement on conventional word processing. My company has just created a writing tool program for the IBM Personal Computer — WORDVISION™ — that breaks new ground in two directions. First, WORDVISION is far easier to use than earlier programs. Second, WORDVISION'S suggested retail price is far lower than prevailing levels. I'd like to tell you how and why we accomplished this.



Today's programs leave plenty of room for improvement.

As tools to assist your personal writing, existing word processors are hamstrung by two leftover influences: Yesterday's computers. And yesterday's jobs.

Existing programs have roots going back to computers much less capable than the IBM PC. Incredibly, these programs still bear the mark of design constraints imposed back when editing was done on teletypewriters that slowly clacked out copy. They also are shackled by designs intended either for a dictator-and-secretary context or the writing of computer program code — both of which have different needs from personal writing. The effect is that to learn and use them you have to work harder than is now necessary.

WORDVISION was designed from scratch for the IBM PC.

In several ways, IBM's Personal Computer is more powerful than earlier machines, small or big. Its built-in display

eliminates need for any terminal — either the teletypewriter or newer video kind. The PC's display can be changed from top to bottom in an instant, allowing program features not possible on computers using terminals. Also, the PC's screen can show details like underlining and bold printing, either directly or using colors. Another assist is the array of useful keys found on the PC keyboard but not on old-fashioned terminals, these provide easy ways to control a program's operation. And the PC is designed to have plenty of memory, which also encourages easy-to-use program design. To use all this power, we began WORDVISION's design with a clean slate. The result is a program that, unlike



If you understand traffic lights, you already know one of WORDVISION's main operating principles.

its predecessors, won't ask you to memorize arcane codes or keep track of disorienting modes.

WORDVISION includes a set of handsome, full-color key legends that affix to your keyboard and show you the available controls. (Optional replacement keycaps will also be available.) Where other programs suggest you read their manual when you get stumped, WORDVISION is so easy you can usually just read the keyboard instead.

WORDVISION is designed for your personal writing.

Early word processing programs were designed either for computer programmers or secretaries. But programmers are used to dealing with computer idiosyncrasies, and the secretarial process is a linear, static incorporation of someone else's requested changes in how a document looks or what it says. Our writing tool is specifically designed for the more fluid, dynamic process of interacting with your own words — where each new thought may inspire changes anywhere in your text, and you want to see easily how a change would look or sound.

WRITING TOOL THAT, AT \$49.95, DOES HARD OR PAY TOO MUCH.

JAMES, PROGRAM PUBLISHERS



selling lets us spread our costs over lots more copies than earlier programs.

There are other factors too: We've eliminated the need for expensive "support" that others must build in to their program prices. With the help of our Wordvision Pioneer corps (see below) we'll refine out any confusing parts before publication. Also, Wordvision doesn't ask you to buy features most people don't need. Wordvision by itself is a good, solid tool for personal writing. Additional "bells and whistles" that some people require will be offered separately as Wordvision PowerPacks. You have to buy only what you can use.

Further explaining our low price is that we want you as a customer for the whole family of easy-to-use programs we'll be introducing over the coming months. Once you see how easily Wordvision works for you, we expect you'll find the others hard to resist.

WORDVISION'S ease helps account for its low price.

A program that lots of people are able to use can sell profitably at a price lots of people can afford. Wordvision's low price marks the next stage in the evolution of the program marketplace.

Wordvision sells for as little as one-tenth the price of earlier word processing programs, but when those were introduced they had the same relationship to the \$5,000 programs then being sold for prior-generation computers. The large number of personal computers IBM is

WORDVISION FEATURES

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SWAP • FIND AND REPLACE
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... AND MANY MORE

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One other way of keeping Wordvision's price low is by selling it in a brand new place for personal computer programs — bookstores. Wordvision will be on sale at major bookstores, as well as other selected program retailers, beginning in early 1983. If your favorite store doesn't have it, ask them to call our toll-free number and order it for you. Or, for an advance copy, see the adjacent special offer.

How to get a copy two months before the rest of the world, and maybe for free:

A SPECIAL OFFER FOR PIONEERS — If you'll help us put the finishing touches on Wordvision, we're prepared to make it worth your while. Buy a copy of our limited Preview Edition and you will get:

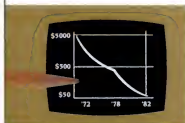
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- First delivery of the fully polished, official version of Wordvision — in a special signed and numbered Pioneer's Edition.
- As a bonus with your official edition, a free copy of our Translation PowerPack (suggested retail price, \$19.95) that lets you convert text created with other IBM PC programs for use with Wordvision.
- First crack at similar Pioneer offers for the many powerful new programs and PowerPacks we plan to introduce soon.

This limited offer is first-come, first-served, except we reserve the right to select participants to make sure our Preview Edition is put to work in a wide variety of settings. To participate, write us with details of your IBM PC system, the ways you plan to use Wordvision the name and address where you would like it sent, and enclose \$49.95. (Ohio residents please add sales tax.) Or call our toll-free number — 800/531-1909 — if you wish to use your charge card. (In Ohio, call 614/766-0110.) If you're too late for the Preview Edition, we'll put your name on a priority list to receive Wordvision when it is officially introduced.



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Program Price Trend



Wish List



**A reasonably
priced expansion
board which would
have 640RAM and the
necessary ROM to contain the
software to use the extra
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**Disk ejectors,
so that disk
removal would
be easier.**

**Bob Hayes
Dallas, TX.**

**Robert L. Cohen M.D.
East Elmhurst N.Y.**



**A diskette directory
that I can use to keep
track of which file is on
which diskette.**

**Glen Siegel
Thornhill Ontario**



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